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Strategic plan for *fisheries management* and sustainable coastal fisheries in Pacific islands

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A draft of this document was submitted to the
SPC Heads of Fisheries meeting held in August 2003
in Noumea, New Caledonia.

The meeting endorsed the goals and strategies contained in the plan with one additional strategy (4d) and one addition to an existing strategy (6c). These revisions are included in the present document.

The meeting recognized that the strategic plan represents a major long-term initiative benefiting all SPC members and asked SPC to take the strategy forward.

The SPC Regional Policy Meeting on Coastal Fisheries Management,
held in Nadi (17 to 21 March, 2003), was organised by the Fisheries Management Section
of the Secretariat of the Pacific Community (SPC) and supported by funding from
the Commonwealth Secretariat (ComSec),
the Food and Agriculture Organisation (FAO) of the United Nations, and
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The subsequent field study
in selected Pacific island countries (May to June 2003)
was funded by SPC and the Commonwealth Secretariat.

In-country work was facilitated by fisheries authorities in the countries visited.

CONTENTS

Executive Summary

An SPC regional policy meeting on coastal fisheries management was held in Nadi in March, 2003 and a field study was completed in selected Pacific island countries during May and June 2003. The aim of both the meeting and the subsequent field study was to work with fisheries agencies and other stakeholders to devise a strategic plan for fisheries management and sustainable coastal fisheries in Pacific islands.

Of all the issues discussed by participants, the reduction in catches of inshore marine species was of most concern. Traditionally, seafood has been the most important source of protein in Pacific islands. However, catches of the most accessible seafood - the fish, seaweed and shellfish of the lagoons and reefs - have been declining in some island countries over many years. In the few islands where data are being collected continuously, the recorded decline has sometimes been dramatic; in Guam, for example, catch rates have decreased by 70% over the past 15 years.

Participants suggested that reasons for the decline in inshore catches include overexploitation, a shift from subsistence to commercial fishing, the use of overly efficient and destructive fishing methods and environmental degradation. Growth in human populations (approaching 4% per year in some islands) is placing increasing pressures on coastal ecosystems and their resources. In response to the declining stocks of inshore species, fisheries agencies are needing to change their focus from development to conservation in order to allow fish stocks to recover. Whereas in the past emphasis has been on making exploitation more efficient (eg by encouraging the use of modern boats and fishing gear), at present the emphasis is on reducing fishing mortality (eg by controlling fishing effort and by restricting the use of certain fishing gear).

Country representatives were particularly concerned about the use of overly efficient gears – the use of gill nets in lagoons, underwater torches to spear fish sheltering on reefs at night, and SCUBA gear to spear fish and lobsters are examples. In addition, several countries are having to combat the use of destructive fishing methods including the use of explosives and poisons.

Typically, local fisheries agencies have insufficient resources and expertise to assess and manage coastal fisheries in spite of the important role these play in food security and poverty reduction.

Many fisheries agencies believe that training as well as attachments to regional organizations and to the national programs of other countries are necessary to enhance the expertise of their staff. In particular, skills are required in assessing the status of fish stocks and in collecting catch and effort data from subsistence fisheries. There is a widespread need for a simple method (using household surveys) of collecting fisheries data, including socio-economic information, from fishing communities.

National governments in Pacific islands have imposed a variety of regulations that either restrict fishing (input controls), restrict the catch (output controls) or protect the marine environment. However, many participants believed that their fisheries regulations were either in need of review or inadequately enforced (or both) and that there is a requirement for assistance in these areas.

The involvement of stakeholders is increasingly regarded as essential. Some fisheries agencies are promoting community-based fisheries management (CBFM), often with SPC involvement, and many others have expressed interest in receiving assistance in doing so. Gender issues in this respect are regarded as particularly important and efforts are being made to involve women and untitled men in community management decisions.

Many fisheries agencies believe there is little public support for the aims of fisheries management and the necessity of fisheries regulations. Training and other assistance are required in the production of publicity material, including the preparation of media releases and information sheets, to increase public awareness.

Meeting participants considered that the degradation of fish habitats including coral reefs, lagoons and wetlands has contributed to the decline of inshore fish stocks. This suggests that a broader ecosystem approach to fisheries (EAF) is needed to replace the narrower target-species approach to fisheries management. The problems of achieving EAF are exacerbated by there being two separate government authorities responsible for fisheries and the marine environment. Many participants believe that marine protected areas (MPAs) are important in that they provide refuges in which invertebrate and fish stocks can grow and reproduce. Although the number of MPAs, both nationally and community-owned, is growing throughout the region, some countries are encountering problems in establishing workable MPAs. Attachments to countries with successful MPAs, as well as assistance and training is required in both the siting and monitoring of these.

Suggested goals and strategies derived from this project are included in Section 4. A full list of required assistance and training is provided in Section 5 and recommendations from the Nadi meeting are listed in Annex 10.1.

It is intended that all information from the meeting and subsequent field study will be used to revise the activities and outputs of the newly-formed SPC Coastal Fisheries Management Section to ensure that these accurately reflect the needs of member countries and territories. As a demand-based assessment of the needs of Pacific island countries, this paper also provides a source document for donor agencies wanting to assist island countries to protect their marine environments and to manage their fisheries resources on a sustainable basis.

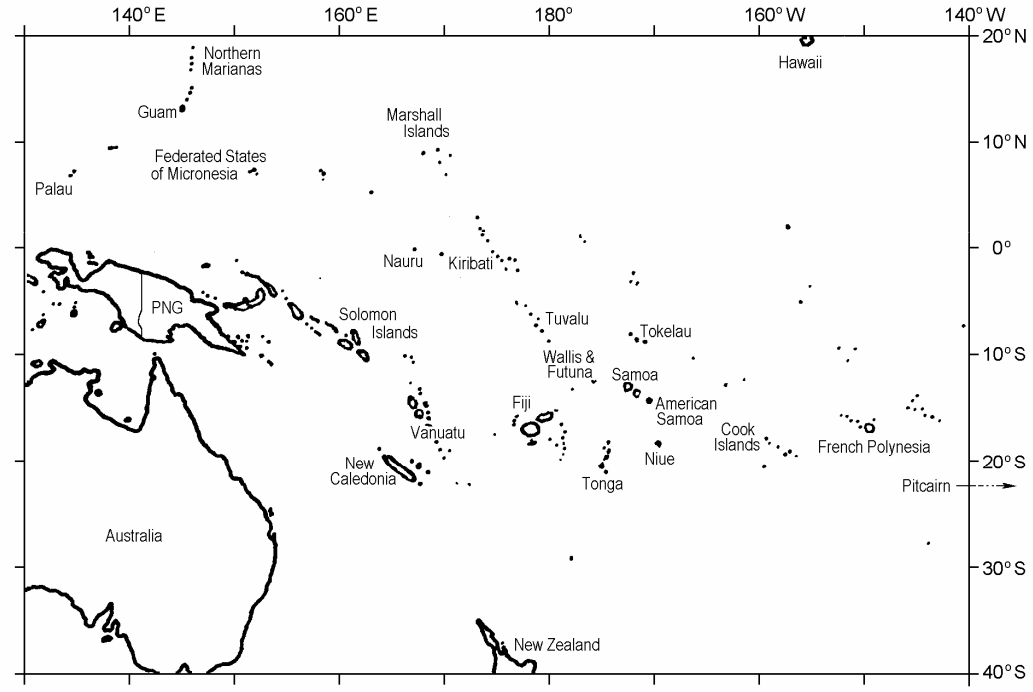

Figure 1: The Pacific island region showing the 22 member countries of SPC. Australia, New Zealand and Hawaii are included for geographic reference.

King, M. Fa'asili, U. Fakahau, S and Vunisea, A. 2003.Strategic plan for fisheries management and sustainable coastal fisheries in Pacific islands. Secretariat of the Pacific Community, New Caledonia.

1. Background and context

Traditionally, seafood has been the most important source of protein in Pacific islands. and this is particularly so in low-lying islands and coral atolls where soils are too poor to support agriculture. In some atolls seafood consumption may be as high as 150 kg per person per year (compared with a world average of about 12 kg per person). Even in high islands where agriculture is well developed, seafood consumption often approaches 50 kg per person per year

In most, if not all, Pacific Island countries, the total weight of seafood caught in subsistence, or village, fisheries is greater than that from commercial fisheries. And, when a nominal value per kilogram is put on the subsistence catch, it is often found to be of greater value than commercial catches. This is particularly so if one considers the net profits from commercial fisheries, many of which rely on imported boats, equipment, and even bait. Subsistence fisheries on the other hand, are intensive in labour but generally low in other fishing costs. In addition, the catches from coastal areas result in health benefits and cost savings beyond their intrinsic value.

However, catches of the most accessible seafood - the fish, seaweed and shellfish of the lagoons and reefs - have been declining in some island countries over many years. This decline has reduced the prospects of food security in coastal communities and affected the participation of women, often the most important of shoreline fishers and gleaners. Reductions in the availability of seafood from inshore areas have also created a greater reliance on the importation of low quality protein, including mutton flaps (ribs) and turkey tails; this trend is contributing to the high incidence of heart disease, diabetes and other diet-related diseases in Pacific islands. Growth in population sizes (approaching 4% per year in some islands) is continuing to place pressure on coastal ecosystems and their resources. And as demands for seafood species increase, the ability of the marine environment to sustain them is likely to decrease. The coast is in increasing demand for housing and development. And the sea that supports coastal ecosystems is being polluted by silt, chemicals and waste from towns, forestry, agriculture and industry.

Concern over such problems by member countries and territories at the second SPC Head of Fisheries meeting in July 2001 prompted a recommendation for a broadly-based regional consultation on fisheries management. In response, SPC with support from the Commonwealth Secretariat undertook to arrange for a participatory examination of issues and concerns in relation to coastal fisheries management in Pacific island countries.

Life-style changes and the requirements of a growing cash economy in Pacific islands will continue to result in further shifts from subsistence to commercial fishing. Fisheries managers in Pacific islands have to address the implications of this, not only in terms of development and income generation, but in terms of sustainability and food security. This strategic plan will assist in developing the capacity of island governments, and the region as a whole, to achieve the Millennium Development Goals (MDGs) on poverty reduction and outcomes of the 2002 Johannesburg World Summit on Sustainable Development (WSSD 2002). The relevant requirements of these include actions to;

- Implement strategies for sustainable development by 2005
- Reverse the loss of environmental resources by 2015
- Maintain or restore fisheries stocks on an urgent basis and where possible by 2015.

The impact of globalisation on socio-economic development and the sustainable use of fisheries resources in the region emphasises the use of international instruments under both the United Nations Convention on the Law of the Sea (UNCLOS, 1982) and the United Nations Conference on Environment and Development (UNCED, 1992). In particular, Chapter 17, Agenda 21 of UNCED provides a basis for national policies and strategies on the sustainable development and management of coastal fisheries.

2. Aims and methods

The overall aim of the undertakings resulting in this document was to work with fisheries agencies and other stakeholders to devise a strategic plan for the management of coastal fisheries in Pacific islands.

The methodology included obtaining pre-meeting information on key problems in coastal fisheries management through questionnaires. The results obtained were presented and discussed at the SPC Regional Policy Meeting on Coastal Fisheries Management held in Nadi, Fiji, from 17 to 21 March, 2003. The purpose of the Nadi meeting was to provide a forum for country representatives to address common problems in coastal fisheries and suggest how the SPC Coastal Fisheries Programme and other agencies could assist countries in taking remedial actions. Of the 22 SPC member countries and territories, 17 were represented at the meeting. Participants and resource people shared experiences and used problem-solution tree techniques to suggest actions necessary to address the problems identified.

A subsequent field study in selected Pacific island countries was conducted during May and June 2003 to assist fisheries agencies to review their needs and their capacity to address the problems in fisheries management identified at the Nadi meeting. The field study was restricted to thirteen countries due to limited funds and other member countries were contacted by fax or email and invited to supply similar information.

During the field study, advisers were mindful to make the distinction between needs and wants. Care was taken to relate stated needs to those activities required to address the most pressing problems in managing fisheries resources and protecting marine habitats.

Although it is impossible for SPC to directly address all of the identified needs, those that can will be incorporated in the work plan of the Coastal Fisheries Management Section. In others, SPC will undertake to identify available sources of assistance and seek donor funds. On many issues, SPC will play the role of an advocate or facilitator in the provision of assistance and capacity building.

3. Results and recommendations

Results obtained from the questionnaires were collated as a summary of key problems in coastal fisheries management (Table 3.1) and presented at the SPC Regional Policy Meeting on Coastal Fisheries Management held in Nadi, Fiji, from 17 to 21 March, 2003.

Table 3.1: Summary of problems* in coastal fisheries management (percentages are based on the number of countries identifying particular problems as most important).

Overexploitation of marine species	78%
Inadequate or outdated fisheries regulations	50%
Inadequate enforcement of fisheries regulations	50%
Lack of capacity in the country – eg in stock assessment, data collection	50%
Destructive fishing methods – eg explosives, breaking coral	39%
Overly efficient fishing methods – eg night diving, small mesh nets, SCUBA	22%
Overlap between national/provincial/island responsibilities	17%
Shift from subsistence to commercial fishing	11%
Ciguatera fish poisoning	11%
Illegal fishing by foreign vessels	6%

In addition to the above, respondents noted problems associated with the pollution or degradation of wetlands and coastal zones. Of these, siltation, eutrophication and uncontrolled or excessive coastal development were prominent.

At the Nadi meeting, participants and resource people shared experiences and used problem-solution tree techniques to suggest actions necessary to address the problems identified; these are summarised in Annex 10.4. Participants also identified the many difficulties that fisheries authorities face in taking actions to solve these problems.

Results from both the Nadi meeting and the subsequent field study are provided under the relevant topic headings below. Recommendations referred to numerically (1 to 11) are those proposed and seconded by participants at the Nadi meeting; these are included not necessarily in sequence but under the relevant topic headings. All recommendations are included sequentially in Annex 10.1.

3.1. Fisheries agencies and staff qualifications

This issue is related to the following questions discussed with fisheries agencies.

Is the organisational structure of the fisheries agency optimal to address coastal fisheries management problems? Is assistance required with institutional strengthening?

Are fisheries agency staff qualified to pursue actions to address the key problems identified? If not, what specific assistance, attachments or training is required?

The capacity of many Pacific island countries to manage their coastal fisheries is severely constrained by the lack of financial, human, and physical resources. Several fisheries agencies have been reduced as a result of government reforms or political changes (for lack of government awareness see Section 3.5).

Some participants believed that their fisheries agency could be enhanced by external assistance, either in the form of a review of the organisational structure or a complete human resources development review and a training needs analysis.

In response to the declining stocks of inshore species, many fisheries agencies are having to change their focus from development to conservation. Whereas in the past emphasis has been on making exploitation more efficient (eg by the provision of boats and modern fishing gear) it is now on reducing fishing mortality (eg by controlling fishing effort and by restricting the use of certain gear) in order to allow fish stock numbers to increase to former levels. These changes are likely to require a different mix of expertise in fisheries agencies.

Many fisheries agencies believed that training and attachments to regional organizations and to successful national programs of other countries were necessary to enhance the expertise of their staff. This is reflected in the following recommendation from the Nadi meeting.

> **Recommendation 8 (from Nadi meeting).** It is recommended that the SPC Coastal Fisheries Management Section should assist with capacity building through attachments of island nationals.

In particular, participants believed that skills are required in assessing the status of fish stocks and in collecting catch and effort data from subsistence fisheries – these requirements are discussed under the following heading.

3.2. The status of coastal fisheries - statistics and other indicators

This issue is related to the following questions discussed with fisheries agencies.

What is the status of inshore fish stocks? Do fisheries agencies have adequate data and statistics (or other indicators) to monitor the well-being of coastal fisheries? If not, what specific assistance is required?

Of all the issues and problems presented by meeting and field-study participants, the decreasing numbers in stocks of inshore marine species was of most concern. Catches of the most accessible seafood - the fish, seaweed and shellfish of the lagoons and reefs - have been declining in some island countries over many years (Dalzell et al 1996).

Participants and interviewees suggested many reasons for the decreasing inshore catches. These included overexploitation, growth in human populations (approaching 4% per year in some islands), a shift from subsistence to commercial fishing, environmental degradation and the use of overly-efficient and destructive fishing methods (including the use of explosives and poisons).

The use of modern materials such as small-mesh chicken-wire for fish fences and traps and monofilament nylon for gill nets, for example, has made fishing effort more effective. In some cases, quite modest developments such as the use of underwater torches for night diving (which allow the spearing of fish resting under corals at night) have resulted in a dramatic increase in fishing efficiency.

In some countries, the use of explosives and poisons to kill or disable fish represents causes serious damage to marine ecosystems and the long-term viability of fisheries. These destructive fishing methods include the use of toxic plants, commercially available poisons such as bleaches (sodium hypochlorite), insecticides, and explosives. The collateral damage associated with the use of poisons and explosives is that smaller animals, including larvae and coral polyps, are more readily killed than the target species. Destroyed corals result in low fish production, and reefs may not recover for over 20 years.

Some traditional fishing methods such as fish drives and gleaning activities also cause damage to corals, either directly as a result of breaking coral to catch sheltering fish, or indirectly through the impact of many people moving over the reef. In the past the marine environment was more likely to be able to sustain such damage because the frequency of the activity was low and fewer people were involved.

The strong feeling that training is required in assessing the status of fish stocks including the collection of fisheries data from subsistence fisheries was reflected in the following recommendation from the Nadi meeting.

> **Recommendation 1 (from Nadi meeting).** It is recommended that SPC examine ways to assist countries to collect inshore fisheries data and develop a statistical data storage system with special emphasis on national fisheries agencies with small numbers of personnel.

Demand for a simple method of collecting fisheries data (using household surveys) from fishing communities is widespread. Where data are collected from different community fishing areas with similar ecological characteristics it may be possible to apply a surplus yield model (over area rather than time) to estimate the average sustainable catch and to indicate villages in which resources are presently under pressure (King 1995). The provision of short-term training using a step-by-step manual including a purpose-built database on a compact disc has been suggested.

Recommendation 2 (from Nadi meeting). It is recommended that SPC identify resources to conduct training on statistics and data collection. In addition SPC provide advice on the use of these data for fisheries management.

Many participants were of the view that aquaculture developments and fishing beyond the reefs around fish aggregating devices (FADs) would reduce fishing pressure in lagoons and on near-shore reefs. Accordingly, assistance was requested in the following recommendation.

Recommendation 10 (from Nadi meeting). It is recommended that the SPC coastal fisheries program coordinate its activities with the aquaculture, FAD, and artificial reef programmes to promote these as alternatives to existing coastal fisheries.

3.3. Fisheries regulations and enforcement

This issue is related to the following questions discussed with fisheries agencies.

Are existing fisheries regulations and their enforcement adequate to address concerns of over-fishing? Is assistance required?

National governments in Pacific islands have imposed a variety of regulations that either restrict fishing (input controls), restrict the catch (output controls) or protect the marine environment. However, many countries believed that their fisheries regulations required updating and assistance to do this was needed.

Recommendation 4 (from Nadi meeting). It is recommended that SPC establish a legal service to respond to requests from island countries for assistance in legislation related to coastal fisheries.

Restrictions on fishing activities were widely discussed. These included banning a specific fishing method in particular areas, or on a particular species; the use of gill nets in lagoons and SCUBA diving to catch lobsters were of particular concern in several countries.

Minimum legal sizes have been applied by national governments in Pacific islands to many species including sea cucumbers, trochus, pearl-oysters, giant clams, spiny lobsters, mangrove crabs and many species of fish. Traditionally, size limits have been applied to allow individual fish to spawn at least once before capture. Many country representatives believed that advice on size limits was required and this prompted the following recommendation at the Nadi meeting.

Recommendation 5 (from Nadi meeting). It is recommended that SPC document and recommend regional size limits for important species to help countries in the preparation of regulations.

Fisheries management strategies usually require regulations, which, to be effective, must be enforced. However, the first and most important aspect of enforcement is education, and prosecution should be regarded as a measure of last resort. If the majority of users support the aims of the regulations, peer pressure becomes a strong deterrent to those disregarding the law (see discussion on public awareness in Section 3.5). Public and community consultations should accompany the preparation of fisheries regulations.

Although prosecution should be regarded as a measure of last resort, necessary regulations must be rigorously enforced. Regulations which are imposed but unenforced, either due to insufficient enforcement staff, or to overly complex and impractical rules, will fall into disrepute. Fisheries regulations may be applied in urban areas but they are rarely enforced in village areas. Indeed, because of the traditional governing structures of some communities, it would take a brave fisheries officer to enter some villages to enforce national laws. Effective national regulations rely on strong government enforcement around the entire country and this is both time consuming, expensive and sometimes traditionally impossible. Concern over the enforcement of fisheries regulations prompted the following resolution by participants at the Nadi meeting.

Recommendation 11 (from Nadi meeting). It is recommended that SPC establish a framework for the implementation of the enforcement of coastal fisheries regulations.

Alternative ways of applying fisheries regulations were discussed. The cost and practicality of enforcing regulations should be considered when any alternative management strategies are proposed. In some cases, it may be preferable to apply a less direct regulation which is cheaper to police, than a more direct one that is expensive. It may be easier, for example, to prevent small sea cucumbers (below a legal minimum size) being purchased by a few processors than it is to inspect and regulate the catches of a large number of fishers working over an extensive geographic area. In this case, a regulation making it illegal to buy rather than to catch undersize species would be easier to enforce. Although some undersize fish may still be caught, fishers would soon avoid taking smaller individuals that are legally unmarketable.

Enforcement costs often account for a substantial proportion of the total costs of managing a fishery but these costs can be reduced if community-based fisheries management is installed (see Section 3.4). Communities in some countries have the ability to propose fisheries by-laws which regulate fisheries and are recognized under national law (Fa'asili 1997). Under CBFM and village by-laws, fisheries regulations are being enforced by communities with a direct interest in their success and compliance is often high; in addition, there are not the high costs associated with the enforcement of national regulations by government officers.

3.4. Involvement of stakeholders and property-use rights

This issue is related to the following questions discussed with fisheries agencies.

How well are fisheries agencies placed to encourage the involvement of fishers, communities and other stakeholders in fisheries management? Is advice required?

How well are fisheries agencies placed to assign property rights or property-use rights to fishing communities? Is advice required?

In most Pacific island countries, fisheries agencies have the key responsibility for managing living marine resources. However, many other organisations, both government and non-government, as well as fishing communities, fishers associations, processors and fishers have interests and concerns in the process and results of fisheries management. Most agencies recognise that the involvement of stakeholders, particularly fishers, in management is likely to result in greater compliance with fisheries controls and regulations.

Ideally, stakeholders should be provided with a means of providing input into fisheries management policy and implementation. Several countries are, or plan to become, involved in the setting up of fisheries management advisory committees (F-MACs) or other stake-holder groups to be involved in the management of specific inshore fisheries. SPC has produced a manual on the cooperative management of commercial fisheries (Watt, 2001).

Some fisheries agencies are promoting community-based fisheries management (CBFM), often with SPC assistance, and many others have expressed interest in doing so. In most cases the fisheries agency is encouraging and assisting individual communities to manage their own fisheries. Each community is encouraged to define its problems and propose solutions. The community sets its own conservation rules, and it (rather than the government) has ownership of the rules and a responsibility to enforce them. SPC has been actively engaged in promoting the community-based management of subsistence fisheries and has produced a manual relating to this (King and Lambeth, 2000). The wide interest in CBFM prompted the following recommendation from the Nadi meeting.

Recommendation 7 (from Nadi meeting). It is recommended that SPC assist in the development of national community programmes for the management of coastal fisheries resources.

3.5. Public awareness

This issue is related to the following questions discussed with fisheries agencies.

How well is the fisheries agency able to communicate with the public regarding the need for fisheries management and the need for regulations? Is particular assistance with publicity required?

Many fisheries agency staff believed that there was little public support for fisheries management and the imposition of fisheries regulations. This was believed to be due to a lack of public awareness.

Public meetings, radio talks, press articles, information sheets and poster displays may be all used to provide the public with an appreciation of the need for fisheries management and the need to have regulations.

1.Indeed, in some cases, public education is the only practical way to change attitudes towards overexploitation and environmentally damaging practices. An extreme example is where explosives and commercial poisons are used by members of coastal communities. Fishers using such destructive fishing methods are often tolerated, and sometimes highly regarded, in the community, as the catches are usually shared. Because of the isolated fishing locations, as well as lack of public sympathy, enforcement staff have difficulty in apprehending and prosecuting offenders. Public education appears to be the only way of ensuring that the use of such methods is seen as contrary to the long-term interests of the community. If public attitudes are turned against illegal fishing, the practice will eventually be self-policing at the community level.

The main problem is not so much in enforcing fisheries regulations, but in convincing the community that they are necessary. The renewability of fisheries resources depends on the general public accepting controls which not only protect fish stocks, but ensure that the environment in which they live does not deteriorate.

Recommendation 6 (from Nadi meeting). It is recommended that SPC develop non-technical publicity material to be used to assist countries in raising public awareness on the need for fisheries management and fisheries regulations.

In many Pacific islands, politicians and government officials also appear to underestimate the importance of coastal fisheries to their citizens. There have been some suggestions that, if politicians and officials were more aware of the value of subsistence fisheries, the work of fisheries agencies would be more appreciated and better funded through local budgets. The capacity of many Pacific island countries to manage their coastal fisheries is severely constrained by the lack of financial, human, and physical resources (see Section 3.1).

In most, if not all, Pacific Island countries, the total weight of seafood caught in subsistence, or village, fisheries is greater than that from commercial fisheries. And, when a nominal value per kilogram is put on the subsistence catch, it is often found to be of greater value than commercial catches. This is particularly so if one considers the net profits from commercial fisheries, many of which rely on imported boats, equipment, and even bait. Subsistence fisheries on the other hand, are intensive in labour but generally low in other fishing costs.

Subsistence fisheries also provide health benefits and cost savings beyond their intrinsic value. Locally caught and consumed seafood decreases a country's reliance on low quality protein imported from overseas; mutton flaps, turkey tails and canned fish are ubiquitous food items in island countries. Increasing seafood consumption, or restoring it to previous levels, will have benefits in reducing the cost of health care as well as resulting in savings in foreign exchange.

Socio-economic assessments of subsistence fisheries in requesting countries would provide estimates of catch value (based on market prices), import substitution value (in reducing the need to import low quality protein) and health care value (in reducing the long-term health costs of treating diet-related diseases such as diabetes and heart disease).

Such assessments are believed necessary in order to raise government awareness of the direct and indirect value of subsistence fisheries and the work done by fisheries managers in this regard.

3.6. Marine protected areas and the ecosystems approach to fisheries management

This issue is related to the following questions discussed with fisheries agencies.

MPAs have been described as an important tool in fisheries management. How well are fisheries agencies placed to designate such areas if considered desirable?

How well is the agency placed to address environmental problems relating to fisheries? This is related to the need for a broader ecosystem approach to fisheries (EAF) to replace the narrower target-species approach to fisheries management. If other government agencies are involved how could cooperative working arrangements with these agencies be facilitated?

There is wide interest in the use of marine protected areas (MPAs), variously called no-take zones, marine preserves, marine reserves or conservation areas, and these are becoming increasingly common in various forms in Pacific islands.

MPAs have been set up for various purposes including the maintenance of biodiversity and the protection of marine habitats. However, from the view of fishing communities, their value lies in the prospects of eventually securing increased catches in areas adjacent to the MPA. In MPAs fishing may be totally banned or the use of certain types of fishing gear may be banned. Areas may be closed permanently or opened occasionally (or after the passage of some years).

In fisheries management, MPAs are regarded as important in providing refuges in which invertebrate and fish stocks can grow and reproduce without interference. There is evidence that fish biomass increases, rapidly for some species, in areas where fishing is excluded (eg Roberts 1995), and some evidence that this increase will result in higher catches in adjacent fishing areas (Roberts & Polunin 1991; Alcala & Russ 1990). Fish larvae, previously thought of as passive drifters, may be able to detect the presence of, and to swim towards, reefs several kilometres away (Wolanski et al 1997). This suggests that refuge-derived larvae may actively move to, and repopulate, nearby reefs. Alternatively, if larvae settle in the same area in which they were spawned, juvenile or adult fish may eventually move out of refuges in response to increased crowding and competition.

Ideally, a reserve should be located in such a position, and be of sufficient size, to encourage a significant increase in the numbers of sedentary species (including corals) and fish stocks. However, in the case of community-ownership of MPAs there are often constraints on both position and size. In terms of total fisheries production, a small reserve is unlikely to be as effective as a large one. Larger reserves are more likely to provide suitable breeding areas for small inshore pelagic fish such as mullets and scads, but studies in South Africa (Buxton 1996) suggest that even small reserves are beneficial for non-migratory species. In addition, there may be advantages in the recruitment of marine species from a network of smaller community-owned MPAs distributed around the coast (King & Faasili, 1998).

However, the concept of MPAs has not been successful in all Pacific island countries - in parts of Melanesia in particular. Problems have occurred where MPAs have been regarded as a foreign or Western concept that contradicts the traditional view of land and water resource use (Gegeo, 1998). Authorities in these countries believe that a western concept, which is concerned exclusively with marine areas and does not allow for the traditional integration of land and marine based activities, is likely to fail. It is also believed that the term Marine Protected Area needs to be replaced with a local term that reflects the local ownership of the model, land and sea as well as the natural resources within.

Scientific input is also required to advise on the placement of reserves, to monitoring biological changes within the reserves, and collecting data on fish catches in adjacent areas. Interest in the need to determine the benefits of MPAs to communities prompted the following recommendation from the Nadi Meeting

Recommendation 3 (from Nadi meeting). It is recommended that SPC conduct socio-economic surveys in countries that have MPAs to determine if there are difference between areas with MPAs and areas without MPAs.

Meeting participants and field study interviewees considered that the degradation of fish habitats including coral reefs, lagoons and wetlands have contributed to the decline of inshore fish stocks. Environmental disturbances have resulted from not only natural events such as cyclones and storms but also from human activities. These activities include the destruction of nursery areas (including mangrove areas) by road construction and land reclamation. Harbour dredging and coastal building projects often release waterborne silt that reduces sunlight penetration or smothers coral. Poor land management practices have resulted in erosion and the siltation of lagoons.

In addition to the loss of habitats for marine species, environmental disturbances have been linked to increasing incidences of ciguatera fish poisoning and outbreaks of crown-of-thorns starfish.

As a result there is a need for a broader ecosystem approach to fisheries (EAF) to replace the narrower target-species approach to fisheries management. Fisheries management which aims to satisfy human needs for seafood and economic well-being by focussing on fishing activities and stocks of marine species (eg by controlling fishing or limiting the quantity of fish caught) needs to be broadened to include environmental management which aims to conserve the structure, diversity and functioning of ecosystems by focussing on protection of their components (eg the protection of mangrove areas).

The problems of achieving EAF in most countries are exacerbated by there being two separate government authorities responsible for fisheries and the marine environment. In many cases there is little communication and cooperation between these two agencies.

4. Goals and strategies

This section provides suggested goals and the strategies. The proposed strategies are intended to encapsulate both the recommendations from the Nadi meeting and the needs expressed by fisheries agencies during the subsequent field visits. The goals are the main objectives (which may become outputs of the SPC Coastal Fisheries Management Section) and the strategies include the activities required to achieve them

Goal 1: To enhance the capacity of fisheries agency staff to manage sustainable fisheries

Proposed strategies to achieve the above goal are listed below.

1a) Provision of in-country assistance to review or develop an organizational structure and a HRD plan for requesting fisheries agencies. The assistance could vary from 3 to 6 weeks in-country depending on requirements. At the top end of requirements, assistance would include working with fisheries staff and stakeholders to develop a mission statement, goals, activities, outputs and an annual work plan for the agency; a review of staff and training needs would be included. At the low end of requirements, assistance would involve a participatory review of the existing organizational structure and functions.

1b) Provision of support for attachments of individuals from fisheries agencies to relevant SPC programmes and to successful national programs of other countries for the purposes of training and capacity building. Individuals will be attached to an experienced mentor and required to translate reports, working documents and publicity material into his or her national language.

1c) Provision of short courses in the preparation of fisheries management plans. Each course, of 2-3 weeks duration, could be run either at SPC or another central location. The course would take into account the need for a broader ecosystem approach to fisheries (EAP) to replace the narrower target-species approach to fisheries management. The course could also address alternative and innovative ways of applying fisheries controls (see discussion in Section 3.3 and Strategy 3c).

1d) Provision of short courses on *practical* fisheries management issues for staff of fisheries agencies in Pacific island countries. Each course would be suitable for new recruits to fisheries agencies and as refresher training for more experienced staff. Each course, of perhaps 2 to 3 weeks duration, could be run either at SPC or another central location for up to 12 participants per course.

1e) Provision of short courses on the preparation of proposals for funding, designing projects, report writing, and the preparation of papers for publication. Each course, of 2 weeks duration, could be run either at SPC or another central location for up to 15 participants per course. Follow-up activities (written assignments etc) could be conducted by email via a trainer/tutor based at SPC.

Other strategies relating to capacity-building are included under other goals.

Goal 2: To assist fisheries agency staff in their efforts to collect, store, retrieve and analyse basic fisheries data and/or indicators to monitor the status of fish stocks.

Proposed strategies to achieve the above goal are listed below.

2a) Provision of a manual, database and training for the collection and storing of fisheries data from subsistence fisheries. The assistance would include the preparation and provision of a step-by-step manual and a simple database on compact disc. Workshops based on using the manual and the database could be conducted at a central location for staff of fisheries agencies. An in-country visit by an adviser would be necessary for an initial trial run in each requesting country.

2b) Provision of short courses on the use of basic fisheries data in assessing the status of fish stocks. Several fisheries agencies are presently collecting catch and effort data and require training in their use. Others plan to collect data from subsistence fisheries (see 2a) and require similar training. Workshops of 2 weeks duration (using sample data) could be conducted at a central location for relevant staff of fisheries agencies.

Goal 3: To assist countries to review, update and/or develop practical and enforceable fisheries regulations.

Proposed strategies to achieve the above goal are listed below.

3a) Provision of legal expertise to assist island countries in drafting or reviewing legislation related to coastal fisheries. The assistance could be related to both national fisheries regulations and community by-laws. An in-country visit by a legal adviser and a fisheries management adviser is required; the latter to advise on the practicality and enforceability of proposed laws.

3b) Provision of recommendations on size limits for important species on a regional basis to assist countries in the preparation of fisheries regulations. This assistance could be in the form of a booklet containing recommended size limits from studies in the Pacific and elsewhere. Ideally, differences in growth and in attaining reproductive age in different latitudes and environments would have to be considered.

3c) Provision of a workshop on the application and enforcement of fisheries regulations.The course, of 1 week duration, could be run at a central location and address alternative and innovative ways of applying fisheries controls (see discussion in Section 3.3 and Nadi recommendation number 11). As an alternative, this workshop could be attached to other workshops – eg on the preparation of management plans (see 1c).

Goal 4: To assist countries to involve fishers and other stakeholders in fisheries management and to assist with the development of property-use rights.

Proposed strategies to achieve the above goal are listed below.

4a) Provision of training and continuing assistance to enable fisheries agencies to establish community-based fisheries management (CBFM). Training in community motivation techniques and facilitation may be conducted in a central location for nominated participants from several countries. Both women and men will be participants as gender sensitive approaches will be used when working in communities. Each requesting country will require several visits of an adviser. An initial visit is needed to assess existing laws, policies and the agency as well as to design a culturally-acceptable process for a national CBFM programme. A second visit is required to conduct a "train the trainer" exercise for fisheries agency staff. A third visit (and subsequent visits) will be needed to review progress and assist with solving problems encountered.

4b) Provision of assistance in developing community by-laws to be used as tools for fisheries management. An in-country assignment of 1 to 2 weeks in each requesting country would be required to review existing laws and to recommend requirements.

4c) Provision of assistance with the formation of fisheries management advisory committees (F-MACs) and to promote the involvement of other stake-holder groups in the management of specific inshore fisheries (eg on deepwater bottom-fish or sea cucumbers). At least one in-country assignment for an adviser is required to recommend the composition of the committee(s) and to assist in devising terms of reference.

4d*) Provision of assistance to develop a gender-orientated approach that encourages the involvement of women and other disadvantaged groups (included untitled men) in all aspects of fisheries and fisheries management. Training and awareness-raising work will involve national trainers and fisheries officers. Workshops will complement the development of skills required for community-based fisheries management – see Strategy 4a.

** Additional strategy proposed at the Heads of Fisheries meeting in August 2003*

Goal 5: To assist countries in raising public awareness of the need for conservation, fisheries management and fisheries regulations.

Proposed strategies to achieve the above goal are listed below.

5a) Provision of training in preparing non-technical publicity material to raise public awareness of the need for conservation, food security, fisheries management and fisheries regulations. A gender sensitive approach will be emphasised in training, which would include the preparation of media releases (press and radio), information sheets and fisheries newsletters. A course (or courses) of 2 to 3 weeks duration could be conducted at SPC with participation preferences given to information officers from agencies responsible for fisheries and the marine environment.

5b) Provision of non-technical publicity material to raise public awareness of the need for conservation, food security, fisheries management and fisheries regulations. This material, including information sheets and posters, could be prepared in draft form at SPC in English and/or French. This material would be printed in the relevant country languages after translation by local counterparts.

5c) Provision of assistance in conducting socio-economic assessments of subsistence fisheries in requesting countries. Such assessments are believed necessary in order to raise government awareness of the direct and indirect value of subsistence fisheries and the work done by fisheries managers in this regard. Assessments should include estimates of catch value (based on market prices), import substitution value (in reducing the need to import low quality protein) and health care value (in reducing the long-term health costs of treating diet-related diseases such as diabetes and heart disease).

Goal 6: To assist countries to site, survey and monitor marine protected areas and to assist with an ecosystems approach to fisheries management

Proposed strategies to achieve the above goal are listed below.

6a) Provision of assistance to countries by providing training in methods used to assess the suitability of sites for MPAs and to monitor MPAs. Requirements vary from country to country but assistance could include conducting UVCs in requesting countries.

6b) Provision of assistance to conduct socio-economic surveys to determine the benefits of MPAs in requesting countries. This assistance would require in-country work in requesting countries.

6c) Provision of assistance to countries pursuing an ecosystems approach to fisheries (EAF). Initially, this could involve a workshop for two counterparts (one from a fisheries agency and the other from an environmental agency) from each requesting country. *The involvement of participants from relevant NGOs and regional organizations will be encouraged**. The workshop, of perhaps one week duration, could be held at SPC or in another central location. The workshop would involve discussing ways in which environmental issues threatening inshore fisheries could be addressed in a cooperative manner.

** Addition to strategy proposed at the Heads of Fisheries meeting in August 2003*

6d) Provision of training in Environmental Impact Assessment (EIA) techniques. Some fisheries agencies are now being required to conduct EIAs involving the marine environment. Depending on final demand (following the Heads of Fisheries meeting), a workshop, of perhaps one week duration, could be designed and conducted at SPC or in another central location.

5. Summary of training and assistance required

The table below lists the training and assistance required by Pacific island countries. Only assistance related to inshore fisheries management has been included – assistance requested in other areas (with FADs and aquaculture, for example) will be coordinated with the relevant SPC Sections (Recommendation 10 from Nadi meeting).

Notes regarding Table 5.1 are;

- The table includes only the top four priority areas of training noted by countries completing the training questionnaire forms provided by the SPC Fisheries Management Adviser at the Nadi meeting.

- Although the list of assistance and training in the table is believed to be complete, the list of countries wishing to participate may not be. Although requested to submit information, countries not visited during the field survey may not be represented in the table (responses received by 25/6/03 have been included) – other countries may add indications of their interest in specific assistance and training at the Heads of Fisheries meeting.

Table 5.1: Training and assistance required by Pacific island countries.

SC = Short course/workshop;
ICA = In-country assistance and training;
MAN = Manual or booklet to be developed and distributed

Training/assistance required	**Type**	**Requesting countries/territories**
Assistance/training related to Goal 1 – capacity development.		
Review of organisational structure of fisheries agencies; human resources development; review of training needs	ICA	A.Samoa; FSM; Marianas; Marshalls; Niue; New Caledonia (Island Province)? Palau; Samoa; Solomons; Vanuatu
Attachments to relevant SPC programmes and to national programs of other countries for training and capacity building.	…..	Recommendation 8 from Nadi meeting.
Preparation of fisheries management plans for coastal fisheries	SC	A.Samoa; Cooks; FSM; Fiji, Kiribati; Marshalls; Marianas; Nauru; Niue, Palau; Solomons; Tonga; Tuvalu
Practical fisheries management training for new recruits/graduates in fisheries agencies	SC	A.Samoa; Fiji; Tuvalu; FSM
Preparation of funding proposals, report writing, Preparation of papers for publication	SC	A.Samoa; Cooks; Fiji; FSM; Tonga; Kiribati; Nauru; Niue; Palau; Samoa; Tuvalu; Vanuatu.
Assistance/training related to Goal 2 – fisheries data.		
Household surveys of subsistence fisheries using a basic and standard methodology and database	MAN, SC, ICA	Recommendation 1 from Nadi meeting A.Samoa; Cooks; Fiji; FSM; Kiribati; Marshalls; Nauru; New Caledonia; Niue; Palau; Samoa; Solomons; Tonga; Tuvalu; Vanuatu; Wallis & Futuna
Fisheries management for experienced staff Assessment of status of fish stocks Use of statistics/indicators in assessment	MAN; SC;	Recommendation 2 from Nadi meeting Cooks; FSM; Fiji, Kiribati; Marshalls; Niue; New Caledonia; Marianas, Palau; PNG; Samoa; Solomons; Tokelau; Tonga; Tuvalu; Vanuatu; Wallis & Futuna
Assistance/training related to Goal 3 – fisheries regulations and enforcement.		
Review of fisheries regulations and enforcement	ICA	Recommendation 4 from Nadi meeting. A.Samoa; Fiji; FSM; Kiribati; Marshalls Marianas; Palau; Samoa; Solomons; Tuvalu; Vanuatu;Wallis & Futuna
Review of size limits applied in fisheries regulations	MAN	Recommendation 5 from Nadi meeting. Manual to be distributed to all countries
Workshop on the enforcement of fisheries regulations (alternative and innovative approaches)	SC; MAN	Recommendation 11 from Nadi meeting (also New Caledonia).
Assistance/training related to Goal 4 – involving stakeholders.		
Community-based fisheries management	SC; ICA	A. Samoa (ongoing); Fiji; Guam; Kiribati; Nauru; Nuie; New Cal. (Island Province); PNG; Marshalls (ongoing); Solomons; Tokelau; Tuvalu; Vanuatu; Wallis Futuna
Developing community by-laws to be used as tools for fisheries management.	ICA	Fiji; Kiribati; Solomons; Tuvalu; Vanuatu; Wallis & Futuna
Formation of fisheries management advisory committees (F-MACs) for the management of inshore fisheries.	ICA	Niue; Solomons; Tuvalu

Training/assistance required	Type	Requesting countries/territories
Assistance/training related to Goal 5 – public awareness.		
Public awareness training; preparation of publicity material (handouts, press releases etc)	SC	A.Samoa, Fiji; FSM; Kiribati; Marshalls; Nauru; Niue; Palau; Solomons; Tuvalu; Vanuatu; Wallis & Futuna
Public awareness material; preparation of publicity material(information sheets) at SPC	---	Recommendation 6 from Nadi meeting. Publicity material to be produced at SPC and translated in-country.
Socio-economic surveys to determine the value of subsistence fisheries (for government awareness raising)		Fiji, American Samoa, Tuvalu, Solomons; Niue
Assistance/training related to Goal 6 – MPAs and ecosystems.		
Training in siting, surveying and monitoring of MPAs (inc. UVC methods)	SC; ICA	Nauru; Niue; Tuvalu ; Samoa
Socio-economic surveys to determine the benefits of MPAs.	ICA	Recommendation 3 from Nadi meeting
Environmental Impact Assessment methodology	SC; ICA	Fiji
Ecosystem approach to fisheries management workshop for paired senior participants from both Environmental and Fisheries agencies	SC	(suggested by advisers) FSM? Kiribati? Niue? Samoa? Solomons? Tuvalu? Wallis & Futuna?

6. Assistance delivery channels

Identified needs that can be addressed directly by SPC will be incorporated in the work plan of the SPC Coastal Fisheries Management Section. In others, SPC will undertake to identify available sources of assistance and seeks donor funds where necessary. Although SPC is not a funding body, it will play the role of an advocate or facilitator in the provision of assistance and capacity building.

The Coastal Fisheries Management Section is a newly-formed part of the SPC Coastal Fisheries Programme and the needs identified in this review greatly exceed the resources available to meet them. In order to fulfill the most pressing of these needs more resources are needed, particularly in the areas of human resources development, fish stock assessment, community-based fisheries management, public awareness raising, and reviews of fisheries regulations. As a minimum, these resources would include the appointments of a legal adviser and a community fisheries adviser as well as funds to support the short-term input of specialists in other areas.

This document provides a demand-based assessment of the needs of Pacific island countries. As such, it is hoped that it will provide a focus for donor agencies in their efforts to assist island countries to protect their marine environments and to manage their fisheries resources on a sustainable basis. Beside the aid organisations of various countries there are several regional and international organisations from which assistance may be sought.

The Commonwealth Secretariat has played a key role in supporting the activities resulting in this document and has indicated its commitment to provide the Coastal Fisheries Management programme with support to ensure the sustainability of the project.

The Food and Agriculture Organisation (FAO) of the United Nations (through its subregional office in Samoa) is a major source of fisheries-related publications in the region; from the present study, it appears that many of these, such as those referring to an ecosystems approach to fisheries (EAP), are particularly relevant to Pacific island countries. FAO has agreed to a project to provide legal assistance relating to fisheries regulations to Pacific island countries and has expressed a willingness to support training in the collection of fisheries data from subsistence fisheries.

The Western Pacific Regional Fisheries Management Council (WPRMFC) in Hawaii has the expertise and willingness to be involved providing some training including the preparation of fisheries management plans and the collection of fisheries statistics.

7. SPC Coastal Fisheries Management programme

The overall objective of the Coastal Fisheries Management Section of the SPC Coastal Fisheries Programme is the environmentally sound and socio-economically achievable governance of reef and lagoon fisheries (draft Strategic Plan 2003). The draft plan has three outputs and these are reproduced in Table 7.1. Goals and brief summaries of strategies derived from this present study are provided in the right hand column of this table (detailed strategies to achieve the goals are given in Section 4).

Table 7.1: Outputs of the CFP from the draft strategic plan and goals and strategies (in brief) suggested from the present study.

Outputs from draft SPC plan	Suggested goals and strategies from this document
Output 3.1: Assistance to individual PICTs in developing or rehabilitating and promoting socially inclusive and appropriate coastal fisheries development and governance policies and plans.	**Goal 1: To enhance the capacity of fisheries agency staff to manage sustainable fisheries.** 1a) Organizational structure and HRD plans. 1b) Attachments to SPC and national programs. 1c) Preparation of fisheries management plans. 1d) Practical fisheries management issues. 1e) Preparation of proposals, designing projects etc
Output 3.2: Establishment and maintenance of databases of information on Pacific island coastal fisheries and fisheries management practices, and publication of case studies and compendia.	**Goal 2: To assist fisheries agency staff in their efforts to collect, store, retrieve and analyse basic fisheries data and/or indicators to monitor the status of fish stocks.** 2a) Collection and storing of subsistence fisheries data. 2b) Using fisheries data in stock assessments.
Output 3.3: Establishment and maintenance of networks for sharing experiences and expertise in coastal fisheries management.	**Goal 3: To assist countries to review, update and/or develop practical and enforceable fisheries regulations.** 3a) Review of legislation on coastal fisheries. 3b) Recommendations on size limits. 3c) Application of fisheries regulations. **Goal 4: To assist countries involve fishers and other stakeholders in fisheries management and to assist with the development of property-use rights.** 4a) Community-based fisheries management. 4b) Developing community by-laws. 4c) Fisheries management advisory committees. 4d) Gender-orientated approach to fisheries management. **Goal 5: To assist countries in raising public awareness of the need for fisheries management, fisheries regulations and conservation.** 5a) Training in public awareness raising. 5b) Provision of non-technical publicity material. 5c) Socio-economic assessments of subsistence fisheries. **Goal 6: To assist countries to site, survey and monitor marine protected areas and to assist with an ecosystems approach to fisheries management** 6a) Siting and monitoring MPAs – UVC training. 6b) Socio-economic surveys on benefits of MPAs. 6c) Establishing an ecosystems approach to fisheries.

8. Acronyms and abbreviations

CBFM	Community-based fisheries management
ComSec	Commonwealth Secretariat
CZM	(Integrated) coastal zone management
EAF	Ecosystem approach to fisheries
EIA	Environmental impact assessment
FAD	Fish aggregating device
FAO	Food and Agriculture Organisation of the United Nations
FFA	Forum Fisheries Agency
HRD	Human resources development
MDG	Millennium Development Goals
MPA	Marine Protected Area - equivalent to fish reserve, no-take zone etc
ORS	Outer Reef Slope - the area immediately beyond the coral reef
SPC	Secretariat of the Pacific Community
SPREP	South Pacific Regional Environment Programme
USP	University of the South Pacific
WPRMFC	Western Pacific Regional Fisheries Management Council
WSSD	(Johannesburg) World Summit on Sustainable Development (2002).

9. References

Alcala, A.C. and Russ, G.R. 1990. A direct test of the effects of protective management on abundance and yield of tropical marine resources. Journal du Conseil Internationale pour l'Exploration de la Mer 46: 40-47.

Buxton, C. 1996. The role of Marine Protected Areas in the management of reef fish: a South African example. Developing Australia's Representative System of Marine Protected Areas, Ocean Rescue 2000 Workshop Series. 114-124.

Dalzell P, Adams, T and Polunin, N. 1996. Coastal Fisheries in the Pacific Islands. Oceanography and Marine Biology: an Annual Review. 34 395–531.

Faasili U. 1997. The use of village by-laws in marine conservation and fisheries management. Pacific Science Association Intercongress, July 1997, Fiji.

FAO. 1996. Precautionary approach to capture fisheries and species introductions. FAO Technical guidelines for responsible fisheries. Number 2. Rome, FAO. 54 p.

FAO. 2003. The ecosystem approach to fisheries. FAO Technical guidelines for responsible fisheries. Number 4. Supplement 2. Rome, FAO. 112 p.

Gegeo, D.W. 1998. Indigenous knowledge and empowerment: rural development examined from within. The contemporary Pacific – A Journal of Island Affairs. Volume 10, Number 2.

King, M. 1995. Fisheries biology, assessment, and management. Fishing News Books/Blackwell Scientific Books. Oxford, England. 341 p.

King, M.G. and Fa'asili, U. 1998. A network of small, community-owned fish reserves in Samoa. PARKS 8, 11-16.

King, M.G. and Fa'asili, U. 1999. Community-based management of subsistence fisheries in Samoa. Fisheries Management and Ecology, UK, 6, 133-144.

King, M.G. & Lambeth, L. 2000. Fisheries Management by Communities; a manual on promoting the management of subsistence fisheries by Pacific Island communities. Secretariat of the Pacific Community. New Caledonia. 87 p.

King, M.G. 2003 (in press). From mangroves to coral reefs; sea life and marine environment in Pacific islands. South Pacific Regional Environment Programme, Samoa. 100 pp.

Roberts, C.M. 1995. Rapid build-up of fish biomass in a Caribbean marine reserve. Conservation Biology. 91(4) 815-826.

Roberts, C.M. and Polunin, N.V.C. 1991. Are marine reserves effective in management of reef fisheries? Reviews in Fish Biology and Fisheries, 1, 65-91.

United Nations, 1982. The Law of the Sea: United Nations Convention on the Law of the Sea. 224p.

Watt, P. 2001. A manual for the co-management of commercial fisheries in the Pacific. Secretariat of the Pacific Community. New Caledonia.

Wolanski, E. Doherty, P. and Carleton, J. 1997. Directional swimming of fish larvae determines connectivity of fish populations on the Great Barrier Reef. Naturwissenschaften 84, 262-268.

10. Annexes

Annex 10.1. Recommendations from participants at the SPC Regional Policy Meeting on Coastal Fisheries Management, held in Nadi (17 to 21 March, 2003).

Recommendation 1. It is recommended that SPC examine ways to assist countries to collect inshore fisheries data and develop a statistical data storage system with special emphasis on national fisheries agencies with small numbers of personnel

Recommendation 2. It is recommended that SPC identify resources to conduct training on statistics and data collection. In addition SPC provide advice on the use of these data for fisheries management.

Recommendation 3. It is recommended that SPC conduct socio-economic surveys in countries that have MPAs to determine if there are difference between areas with MPAs and areas without MPAs.

Recommendation 4. It is recommended that SPC establish a legal service to respond to requests from island countries for assistance in legislation related to coastal fisheries.

Recommendation 5. It is recommended that SPC document and recommend regional size limits for important species to help countries in the preparation of regulations.

Recommendation 6. It is recommended that SPC develop non-technical publicity material to be used to assist countries in raising public awareness on the need for fisheries management and fisheries regulations.

Recommendation 7. It is recommended that SPC assist in the development of national community programmes for the management of coastal fisheries resources.

Recommendation 8. It is recommended that the SPC Coastal Fisheries Management Section should assist with capacity building through attachments of island nationals.

Recommendation 9. It is recommended that activities of the SPC Coastal Fisheries Management should not be prioritized as countries have different levels of activities which may not accurately be reflected if prioritized.

Recommendation 10. It is recommended that the SPC coastal fisheries program coordinate its activities with the aquaculture, FAD, and artificial reef programmes to promote these as alternatives to existing coastal fisheries.

Recommendation 11. It is recommended that SPC establish a framework for the implementation of the enforcement of coastal fisheries regulations.

Annex 10.2: Log of discussion in countries visited during the field study.

American Samoa - 30/5/03

Meetings with:

Department of Marine and Wildlife Resources staff
Ray Tulafono, Director
Michael King, Community-based fisheries management programme
Fatima Sauafea, Community-based fisheries management programme
Community-based fisheries management programme staff

Key points of meetings:

Issues raised at the SPC meeting in Fiji were presented and discussed. American Samoa has an active community-based fisheries management programme and has received SPC assistance to establish this. There are now six communities involved and two more are under process. Other island communities have no concerns regarding the status of their fish stocks and, understandably, have no motivation to join the programme.

The Department collects fisheries data and has access to qualified staff to analyse these. However, new graduates from US universities are due to start work in the Department this year and the Director requested a short course in practical fisheries management for the new recruits. He also requested staff training in publicity and communications to increase public awareness of the need for fisheries management and regulations.

An ecosystem approach to fisheries management including the setting up of Marine Protected Areas are being pursued under join committees on which there are representatives from environmental and other agencies. Shared committees include the Coral Reef Advisory Committee (advisor to the Governor) and the Coastal Zone Management Project (a Federal authority). The Department intends to establish more marine protected areas and an MPA coordinator is soon to be appointed.

All new construction projects require notification and a decision is then made on whether or not an environmental impact assessment (EIA) is required. If necessary, EIAs are conducted by the Environmental Protection Agency and the Army Corps of Engineers.

Fiji - 12 May to 16 May

Meetings with:

Mathui Ligabalavu, Permanent Secretary
Malakai Tuilua, Deputy Director of Fisheries
Sikeli Valemei, Policy Planning Unit
Vasiti Vaiyasawa, Aquarium Project Officer
Johnson Seeto, USP

Key points of meetings:

Questions and issues collated from the results of the SPC meeting in Fiji were discussed. The Fisheries Department has identified 10 sites for a community-based fisheries management project in cooperation with LAMMA and was interested in further assistance from SPC in this regard.

Concern was expressed regarding the PROCFISH approach. The Fisheries Department is, however, interested in a simple methodology of estimating fishing effort and seafood catches in subsistence fisheries. Assistance with a simple and locally-based database to store and retrieve the data was also requested. The A/D requested training in practical fisheries management for new graduates joining the Fisheries Department; this was seen as necessary to provide new appointees with a practical rather than a theoretical approach to fisheries management.

A new Information Officer has recently been appointed to the Fisheries Division. The A/D requested training in the preparation of publicity material including press releases and information sheets as well as in delivering radio talks on fisheries matters – these were seen as methods of increasing public awareness of the need for fisheries management and controls.

Fisheries regulations are due to be reviewed and legal assistance was requested for this task. A legal officer may soon be appointed to the Fisheries Department.

At present there are no legal requirements for environmental impact assessments (EIAs) in Fiji although new development projects have been required to complete these. One fisheries officer has been assigned to conducting EIAs and training was requested in the survey methodology and reporting involved.

Guam - 4 May to 7 May 2003

Meetings with:

Division of Aquatic and Wildlife Resources,
Department of Agriculture.
Gerry Davis, Chief
Trina Leberer, Fisheries Supervisor

Key points of meetings:

Fish catch rates in Guam have dropped by 70% over the past 15 years. The Division is combating this by establishing marine protected areas (MPAs) as a first step and there are five such “no-take” areas at present.

It is believed that further steps to reduce fishing mortality are necessary. These will include reducing the use of overly efficient fishing gear. The use of gill nets is of particular concern and options include banning the gear or enforcing minimum mesh sizes.

Questions and issues collated from the results of the SPC meeting in Fiji were discussed.The Division has few problems with funding (due to access to taxes on fishing gear in the USA) and has access to qualified staff and expertise. However, interest was expressed in receiving assistance with establishing community-based fisheries management. This is acknowledged to be difficult due to the lack of formal governing structures in fishing communities.

Honolulu - 29 April to 3 May 2003

Meetings with;

Representatives of the Western Pacific Regional Fishery Management Council.
Ms Kitty Simonds, Executive Director
Paul Dalzell, Biologist - pelagic
Mark Mitsuyasu, Fisheries Programme Officer
Paul Callaghan, Chairman, Scientific & Statistical Committee (Guam)

Key points of meetings

Questions and issues collated from the results of the SPC meeting in Fiji were discussed and the purpose of the study tour to USA-aligned countries was explained.

WPRFMC may be interested in conducting training on legal issues and on the preparation of fisheries management plans. Training would not be necessarily restricted to American territories. Interest was also expressed in developing a simple methodology to assess subsistence fisheries.

Kiribati (Tarawa) - 16/5/03 - 19/5/03

Meetings with;

Tukabu Terorako, Secretary, Ministry of Natural Resources
Maruia Kamatie, Chief Fisheries Officer, Fisheries Division
Awira Ribanatake, Fisheries Division
Barerei Onorio, General Manager, Central Pacific Producers, Betio
James Uan, Training Officer, Fisheries Division
Tererei Abete-Reema, Deputy Director, Ministry of Environment and Social Development
Kautu Temakei, EIA Officer, Ministry of Environment and Social Development

Key points of meetings.

Aquaculture on pearl oysters, trochus, sea cucumbers and seaweed are high priority activities. At present divers collect restocked white teat fish and about 600 tonnes of Euchemia per year is collected from 7 locations, particularly from Fanning.

Locally designed canoes with outboards and ice-making plants have been provided for the use of local fishers on four outer islands. A government vessel collects reef fish and pelagic fish from the four islands and the catch is sold by Central Pacific Producers in Betio (it is planned to extend this service to two additional islands in the future). The vessel visits the four islands up to twice a week depending on fish catches.

Good records are kept of all catches. An average of 8 tonnes per month is transported from all four islands with the highest catch weight coming from Abaiang with an average of 4.7 tonnes per month (data from Jan to Sept 2002). Each island has less than 12 square kilometres of land area but more extensive areas of reef.. About 40% of the catch is made up of pelagic species (tuna etc) and the balance consists of more vulnerable species including reef fishes.

The advisers were of the opinion that catches of some reef fishes were too high to be sustainable. Hook and line catches of large emperors and bonefish appear to be decreasing. Some vulnerable invertebrate species such as lobsters and giant clams are also being marketed. Although good catch data (by species) are collected, the SPC advisers suggested that the additional collection of fishing effort data (perhaps at the time of fish sale) would allow the health of stocks to be assessed more readily.

Questions and issues collated from the results of the SPC meeting in Fiji were discussed. The CFO expressed interest in combining a CBFM programme with fish data collection and fisheries management in the four islands from which fish are collected by the government vessel.

Interest was expressed in assistance with fisheries bylaws. Community laws such as those forbidding the use of engines on boats and the use of non-traditional lighting for fishing exist in some islands. Training in fisheries management, particularly in the use of catch and effort data, is required. Assistance is also required in the preparation of publicity material and press releases.

Three conservation areas are in the process of being set up. These include one on Tarawa and one on Christmas island. The Ministry of Environment is involved in the conservation areas and has steering committees and task forces associated with a GEF funded project and an IWP project on waste management.

Marshall Islands (Majuro) - 7 May to 9 May 2003

Meetings wih:;

Marshall Islands Marine Resources Authority (MIMRA), Majuro.
Danny Jack, Deputy Director
Terry Keju, Senior Fisheries Officer (Community Fisheries Specialist), MIMRA
MEIC - Council of MIMRA, EPA, Internal Affairs, and
the College of Marshall Islands.

Key points of meetings:

MIMRA is actively promoting community-based fisheries management (CBFM) with assistance from SPC. The officer in charge, Terry Keju, has strong support from the Women's council for extending the programme. However, constraints to doing this include low staff numbers and the expense of working in distant islands.

Questions and issues collated from the results of the SPC meeting in Fiji were presented and discussed at a meeting of the Council initiated by SPC for the community-based fisheries management project. The council has the acronym MEIC and consists of representatives from MIMRA, EPA, Internal Affairs, and the College of Marshall Islands (MEIC). At the time of the arranged meeting those present were;

- Terry Keju, Senior Fisheries Officer (Community Fisheries Specialist), MIMRA
- Berry Muller, Intern, MIMRA
- Hilton Kendall, Land Lease Officer, Ministry of Internal Affairs
- Karl Fellenius, College of the Marshall Islands (CMI)
- Dean Jacobson, College of the Marshall Islands (CMI)
- Silvia Pinca, College of the Marshall Islands (CMI)
- Deborah Barker, Biodiversity Conservation Officer, EPA

The Council agreed to meet again the following week and provide written responses to the issues discussed and send these by email to SPC. Training required may include the preparation of press releases and publicity material relating to public awareness of fisheries management.

Additional discussions centred around the CBFM programme and the setting up of community-owned Marine Protected Areas (MPAs). Because of the high cost of travel to distant islands, SPC advisers were of the opinion that surveys to locate preferred areas for MPAs could be qualitative rather than quantitative. And, that scientific assessments of MPAs and adjacent areas (conducted by CMI) should rely on funds separate from those needed to promote community-based fisheries management.

Nauru 2 days - 20/5/03 - 21/5/03

Meetings with:

Nauru Fisheries and Marine Resources Authority
Anton Jimwerely, Chief Executive Officer,
Peter Jacob, Principal Fisheries Officer
Charleston Deiye, Principal Fisheries Officer
Margo Deiye, Senior Coastal Fisheries Development Officer
Ebelina Tsiode Awoo, Women's Fisheries Development Officer
Allan Debao

Key points of meetings:

Nauru has very little environmental diversity (no mangroves, estuaries, lagoons etc) and a flat fringing reef surrounds the island. This area is an open access fishing area although some communities have discouraged fishing by people from other communities.

Small boat catches are landed at three launching sites. Approximately 90% of all fish catches consist of pelagic species. Caches from the fringing reef are not known but stocks of invertebrates and fish of the sheltered western side of the island are believed to be depleted. The creation of pools in the flat reefs has been proposed as a method of increasing fish habitats.

Questions and issues collated from the results of the SPC meeting in Fiji were discussed. Interested was expressed in a simple methodology of estimating fishing effort and seafood catches in subsistence fisheries. Assistance with a simple and locally-based database to store and retrieve the data is also required as is advice on the analysis of fisheries data.

There is interest in receiving assistance with the setting up of one or more marine protected areas (MPAs). At the moment a large MPA has been proposed for Ambare Bay. Advice is sought on the siting and size of MPAs. Further discussions centres around cooperating with the Economic Development as the authority responsible for the environment.

Assistance was requested to examine the feasibility of community-based fisheries management. Problem to be overcome in this regard are the lack of community boundaries and lack of community councils. Assistance is required in raising the awareness of the public in relation to the need for fisheries management and regulations. An occasional newsletter is produced by fisheries staff.

Aquaculture prospects are limited to small inland ponds containing brackish water. Milkfish are grown at present and there is a wish to eradicate existing tilapia. There is also a suggestion of introducing barramundi.

New Caledonia (Noumea) - 18/6/03

Meetings with:

Richard Farman, Directeur Adjoint,
Province Sud, Direction des Resources Naturelles

Key points of meetings:

There are three provinces. North, South and Island Provinces. Elected bodies from each province make up the Congress, the legislative body of New Caledonia's administration – making a total of four administrations. New Caledonia is in-charge of the EEZ (exploration and exploitation rights - licensing - management and conservation of biological and non biological resources) and statistics while the provinces are responsible for economic development . The provinces also "share" the jurisdiction over the territorial waters within the 12 nautical mile limit and are therefore responsible for the management of the resources within: inshore and coastal fisheries. The distribution of coastal fishery resources is roughly 80% in the territorial waters and 20% in the EEZ (sea mounts and offshore islands), whereas probably 90% of the tuna resources is in the EEZ and 10% in the territorial waters. Between 4000 and 6000 tonnes of seafood are caught in New Caledonia of which up to 1000 tonnes is from commercial landings of coastal fisheries (excluding deepwater snapper).

Questions and issues collated from the results of the SPC meeting in Fiji were presented and discussed.

Are fisheries agency staff qualified? Yes, staff are qualified to address key problems raised in the SPC policy meeting held in Fiji in April 2003. However, the problem all provinces are facing is staff shortage. The Southern Province has only three extension officers to provide all the extension services and fisheries management. Extension staff are also responsible for the organisation of fishers training in the Maritime school (EMM). The Department's structure is satisfactory at present but generally speaking, it could be worth considering separating administration, development, policy and planning, from research and management activities.

Data and statistics: Commercial fishermen are required to complete a standard logbook as a condition of their fishing permit . This is the main source of data used by the department. From national statistics, it appears that catch data from the coastal, lagoon fisheries is between 800 – 1000 tons, whereas the estimated catch in the subsistence and recreational fisheries is probably around 3 to 4 times more.. The PROCFISH is a good programme but it will take several years before the results can be implemented. Indeed, as the objective is to derive a set of indicators for resource assessment and management, their usefulness will depend on fisheries staff's capacity to implement responsive action rapidly: i.e. the diagnostic and proactive tools derived from the program will only be as effective as the country's ability to use them. Since it may take up to three years to implement a new regulation in the southern province, the local management setup will have to be improved in order to use these results to their full extent. In the meanwhile, the project might want to think of elaborating simple tools that could already be derived from the methodologies used by the researchers that fisheries managers could use and become familiar with: for instance, a simple manual for household surveys would be most appropriate, and complement the work carried out by PROCFISH. Senior High School students have been used here successfully in the past to conduct surveys and it could be done more regularly in the future provided the methods were standardized.

MPAs: MPAs with permanent closure has proved to be more successful in urban areas than rotational closure where the accumulated biomass gets fished out within 90 days of reopening , which is not cost-effective in terms of enforcement and raising public awareness..

Fisheries agency communicating with the public: Awareness activities are carried out mainly by the Environment Department. Fisheries does this through extension services which only reaches the professional sector.

Address environmental problems: Within the southern province, fisheries and environment are located inside the same division (Natural resources) therefore the two departments work closely, especially on the aquaculture issues

Niue - 2/6/03 - 5/6/03

Meetings with

Department of Agriculture, Forestry and Fisheries.
Sauni Tongatule, Director
Brendon Pasisi,
International Waters Project
Sione Leolahi, National Coordinator, IWP
Logo Seumanu, Assistant Coordinator, IWP
Department of Community Affairs
Tagaloa Cooper, Environment Officer
Opili Talafasi, Associate Minister
Hon. Toke Talagi, Finance Minister

Key points of meetings:

Niue has 14 communities of which 5 are on the windward side of the island – the leeward side is more subject to heavy fishing. The fishing fleet consists of 120 canoes and 100 other boats – only 50 of the latter fish regularly. Steve Beverly from SPC is presently assisting with the installation of FADs. Attempts are made to collect catch data from fishing boats and canoes but not from gleaning and reef fishing. The small number of fisheries staff (4) is a severe constraint.

Although the human population has decreased from 5000 about 30 years ago to 1700 at present, catch rates of molluscs and crustaceans are believed to be decreasing. The Niue International Waters Project has determined that the decreasing availability of reef fish, bait fish and invertebrates was of concern to most villages (draft Nuie IWP National Programme report).

Questions and issues collated from the results of the SPC meeting in Nadi were presented and discussed. There is a requirement for an enhanced organisation structure for the Fisheries Division to address expected goals and objectives. At present there are only 4 people in the Division and, taking into account budget constraints, any proposed new structure must be modest. Training in data collection and stock assessment is required – assistance with the assessment of the status of reef stocks of shellfish was requested.

A visit to assist with the development of a fisheries management plan is to be undertaken by SPC in the near future. As there is interest in pursuing community-based fisheries management (CBFM), this plan should take into account the likelihood that communities will be developing their own plans with Fisheries Division assistance (the common situation under CBFM is that communities can impose rules as long as these do not contradict national regulations).

Assistance with developing community-based fisheries management (CBFM) was requested. The International Waters Programme has a project in one village addressing waste disposal and fresh water quality as well as the management of coastal fisheries resources. Suggestions that IWP funds could be used to include some of the other 13 villages in the CBFM programme (assisted by SPC) were discussed.

One MPA (Namoui-Anono covering about 1.5 kilometres of coast) has been declared and another may be associated with the IWP programme. Assistance is being received from SPC with underwater visual census procedures.

Niue has well developed fisheries regulations (Domestic Fishing Regulations 1996) although concern was expressed regarding enforcement. Due to lack of enforcement staff, it was suggested that there was a need for public awareness-raising (of the need for, and purpose of, fisheries regulations). There are three fishers associations (Niue Island Sport Fishing Association, Niue Island Fishermen's Association and Niue Island Canoe Fishermen's Association). There is a need to encourage these association to become more involved in fisheries management issues.

Samoa - 6/6/03 - 10/6/03

Meetings with:

Food & Agriculture Organisation of the United Nations
Fisheries Division, Department of Agriculture, Forestry and Fisheries.
International Waters Project
SPREP
Masanami Izumi, FAO Fishery Officer
Andrew Wright, Project Manager, IWP
Paula Holland, Natural Resource Economist IWP
Mary Power, Coastal Management Officer, SPREP
Tanielu Sua, Chief Fisheries Officer
Atonio Mulipola, Principal Fisheries Officer
Savali Time, Principal Fisheries Officer
Roseti Imu, Senior Fisheries Officer

Key points of meetings:

Later this year, FAO will begin a project which aims to assist Pacific island countries with legal matters relating to fisheries regulations – stage 1 focuses on Palau, Nauru, Marshalls, Kiribati. Mr Masanami Izumi, FAO Fishery Officer, suggested support for a possible joint FAO/SPC project to develop a simple methodology to collect and store fisheries data from subsistence fisheries (as requested by several fisheries agencies). If such a project was to be supported, a brief outline proposal would have to be submitted to Mr Izumi before August; the proposal should include the production of a manual and database for fisheries surveys.

FAO is a major source of fisheries-related publications in the region. The SPC field study team had recommended some of these to promote an ecosystem approach to fisheries (EAP) in Pacific island countries.

Discussions with staff of the International Waters Project (IWP) and SPREP involved cooperation countries where these organisations and SPC are both working. SPC was invited to send a representative to a IWP train the trainers meeting planned for 28 July to 8 August in Port Vila. A workshop on community approaches and facilitation was suggested – perhaps in conjunction with an existing forum such as the SPC Head of Fisheries meeting planned for August. Other discussions included the desirability of producing economic information on the direct and indirect values of subsistence fisheries to Pacific island countries. for ministers

Questions and issues collated from the results of the SPC meeting in Fiji were presented and discussed with the Samoan Fisheries Division. Samoa has an active Management Advisory Committee for its tuna fishery and a community-based fisheries management programme that includes community-owned MPAs. Some MPAs appear to be working well and one village has taken one infringement case to court under the by-law system. Samoa is currently receiving assistance from SPC with its inshore fisheries database. In addition assistance is needed with the collection of inshore fisheries data.

The Division is satisfied with its organisational structure but requested assistance with an independent review of this. The Chief Fisheries Officer requested short-term refresher training in fisheries management and the assessment of fish stocks for more experience staff of the Division but believes that long-term, formal, postgraduate training would be more appropriate for younger staff. Legal assistance was requested in reviewing its fisheries act.

Division staff believed that refresher courses in conducting UVCs in MPAs and adjacent areas were needed. The Chief Fisheries Officer also recommended socio economic studies to examine the effectiveness of MPAs. He also suggested that the information on minimum size limits (recommended at the Nadi meeting) be expanded to include information on what is known about the basic biology of major target species as a manual or perhaps on a website.

Advisers discussed the desirability of a workshop with representative from fisheries and environmental authorities from each country to discuss the inclusion of habitat degradation and other environmental issues in fisheries management. This recognises the need for a broader ecosystem approach to fisheries in place of the narrower target-species approach to fisheries management.

Solomon Islands – 3 to 6 June 2003

Meetings with;

Ministry of Fisheries and Marine Resources
Albert Wata, Permanent Secretary
Gideon Tiroba, Deputy Director, Aquaculture
George Boape, Deputy Director, Licensing Surveillance and Enforcement
Peter Ramohia, Deputy Director, Research and Resources Management
Robert Maneiria, Database Administrator

Abraham Baeanisia, Solomon Islands Development Trust
William T. Atu, Deputy Programme Manager, The Nature Conservancy
Rudi J. Susurua, Solomon Islands Enterprise Coordinator, The Nature Conservancy
Christian Ramo, WorldFish
Cletus Pita, WorldFish
Feleti Teo, Director, Forum Fisheries Agency (FFA)
Abraham Baeanisea, Solomon Islands Development Trust

Key Points of Meetings:

Political situation: The current political situation is affecting the economy causing drastic reduction in Government revenue that supports the civil service. The implications of this on staff number and the development budget of the Ministry of Fisheries and Marine Resources (MFMR) is serious. The reality is that existing staff would not be able to effectively pursue all the necessary actions required to address the key problems identified in the SPC meeting in Fiji due to staff shortage, shortage of operational funds, lack of qualified staff, inappropriate structure, job insecurity, etc..

Are staff qualified? Most of MFMR senior staff are well qualified. However, given the situation the Government is in at present, the best option for improving the capacity of MFMR and other stakeholders is to provide in-country training based on specific training needs of individual staff members, attachments, developing of an awareness programme and provision of development funds and technical assistance.

Structure of the fisheries agency: The structure of MFMR is not optimal to address coastal fisheries management problems effectively because it is to a large extent designed for the command-and-control fisheries management approach. As such, it does not meet the requirements of participants in the coastal fisheries sub-sector including stakeholders such as NGOs, fishers and coastal fishing communities for support and leadership. However, like many other Pacific island states, the capacity for state management is severely constrained, with financial, human, and physical resources all being scarce.

If at all possible, MFMR needs to be restructured to take account of the reality of the situation it is in, to prioritise the dependence of its small-scale fisheries management section on their clients, emphasising the need to effectively communicate, plan, and work with the fishing industry rather than continuing the command-and-control approach. MFNR also needs other stakeholders to play an active role in fisheries management policy decision making and implementation and would like a F-MAC as part of its structure.

Data and statistics: The data on exports that are being collected are inappropriate for the purpose of small-scale fisheries management, not being analysed because of lack of need for management information and total absence of statistical expertise among the two-man team that is responsible for data collection.

The structure of MFMR has to take account of the need for statistics and information for the purpose of coastal small-scale fisheries management. Given the constraints faced by the Government, conventional fisheries management based on fishery science devoted to stock assessment and focusing on biology and economics is no longer relevant in the Solomon's situation and perhaps many other Pacific island states that primarily depend on multi-species small stocks coastal fisheries. There is therefore a need to develop alternative management approaches that include emphasis on the social aspects. Such approaches must include emphasis on management objectives and processes rather than just stock assessment, ways of accessing fishers' knowledge to enrich the information available for management, means to build capacity and institutions, and collaborative approaches to include resource owners and users in the management process. Systems for data collection could then be developed accordingly.

Fisheries regulations: As a follow-up activity to the development of alternative coastal small-scale fisheries management approaches, MFMR needs to review the existing legislation and draft new regulations to match the new management requirements of the coastal fisheries sub-sector. The process would involve: i) the actual drafting of the regulations; and ii) conduct of a country-wide consultation with coastal fishery resources owners and users (ROUs) on the draft regulations. This would ensure that: a) coastal ROUs understand the purpose of the regulations and their potential impact on the resources and their livelihoods; b) inputs of ROUs are taken into account in the draft regulations; c) ROUs feel that they are part of the whole process and accept that sustainable development and management of the resources is their primary responsibility; and d) ROUs accept the approved regulations. Without this fisheries regulations would be seen as a means to criminalise ROUs.

The FFA agreed to cooperate with the SPC on this by making available the services of its legal staff to undertake the review of fisheries regulations related to coastal fisheries.

Encourage the involvement of fishers, communities and other stake-holders in fisheries management: MFMR, for obvious reasons, is not well placed to do this effectively at present. It requires the SPC Coastal Fisheries Management Programme on CBFM and CMT to assist develop its capacity in this area. The proposed regional awareness programme would also play a key role in this.

MPAs: NGOs such as the The Nature Conservancy (TNC) and International Waters Programme (IWP) are the key players in the establishment of MPAs in the country. The results achieved so far are mixed. The process is difficult and time consuming. It is difficult because it involves the introduction of a foreign (Western) concept of conservation, which contradicts the principles surrounding the local systems of conservation of the natural environment and resources on land and water that have been in existence in the country for centuries and effectively managed in traditional ways. The traditional concept of conservation is based on customary ownership of the natural environment and resources both on land and the sea. In other words it does not differentiate between the land and the sea. This is why gardening and fishing are carried out simultaneously as being the main livelihoods of coastal communities.

In contrast, the Western concept of MPA is restricted to marine areas and the resources within and thus differentiates it from the land. Its failure to integrate both land with marine based activities is a fundamental mistake that discourages active participation of communities, particularly when members are displaced from marine based activities in MPAs and there are no alternative land based activities to provide income and food.

The introduction therefore of MPAs, although successful to a certain extent, does not take the importance of utilizing indigenous and local knowledge seriously and thus poses a threat to communities as it introduces elements of conservation that dilute ownership in the true traditional sense. It makes communities feel that MPAs are owned by outsiders. In order to develop MPAs that work, key players, who are often outsiders, must use approaches that aim to strengthen the traditional systems that are already in existence.

Communicate with the public: There is a strong expressed need to develop an awareness programme to inform the public of the importance of sustainable development and management of coastal fisheries. Such a programme would improve awareness among politicians, civil servants and the general public. One of the suggestions made was to include fisheries development and management in the primary and secondary school national curriculum. The awareness programme would also assist solve the misconception that coastal small-scale fisheries is “a social safety net, cultural feature, and source of employment for the less skilled or educated, not as a major engine of the economy”.

Addressing environmental problems: MFMR, Department of Environment and Conservation and NGOs have established a close working relationship. A workshop attended by all was held in May 2003 to emphasise the importance of working together to promote conservation of the natural environment as a key component of all development programmes that involve land and aquatic natural resources, eco-systems and the community. The workshop will be held on annual basis. The proposed awareness programme would contribute positively toward strengthening the on-going cooperative working arrangements. The establishment of an F-MAC would also strengthen this.

Training: Given the staff shortage situation, it is important to: I) put emphasis on in-country short-term training (including on-the-job training) to keep staff absence from their normal day to day duties to a minimum; and ii) adopt the HRD approach to assess staff training needs systematically, develop and conduct training programmes accordingly in order to avoid training for the sake of training, and misplacement of staff after attending training programmes. Only in special circumstances short-term training outside the country and long-term training should apply.

Attachments: There is a need for MFMR extension staff to be exposed to the on-going SPC Coastal Fisheries Management Programme on CBFM and CMT in other countries through attachments. Attachments should also be arranged for key players on establishment of MPAs in island states to share their experiences.

Technical assistance and development funds: There is a need for development funds and technical assistance to address the following:

- develop alternative management approaches to be used on coastal small-scale fisheries and systems on statistical data and information collection;

- review and draft new fisheries regulations for the coastal fisheries sub-sector, and conduct a country-wide consultation on the draft regulations;

- a human resources development (HRD) programme to: i) systematically assess the training needs of individual staff members in fisheries agencies; ii) develop training plans; and iii) develop and conduct the training programmes.

- develop an awareness programme;

- set up of MFMR library (Documentation Centre);

Tuvalu (Funafuti) - 27/5/03 - 28/5/03

Meetings with:

Sam P Teo, Minister of Natural Resources
Lutelu Faavae, Secretary of Natural Resources
Olioliga Iosua, Assistant Secretary of Natural Resources
Malaki Tihala, Department of Fisheries

Key points of meetings:

Tuvalu has freezers on seven islands in the atoll and fish are collected by three government vessels with capacities of 8, 10 and 40 tonnes. Commercial fishing activities in the lagoon near Funafuti are banned under local bylaws. Most fishing is now on pelagic species such as tunas that are caught by trolling.

Questions and issues collated from the results of the SPC meeting in Fiji were presented and discussed. Stocks of some reef species are believed to be depleted and assistance is required in assessing fish stocks (a request to FAO has been submitted). Training in practical fisheries management is also required for local fisheries staff. Interest was also expressed in training in a simple methodology to collect catch and effort information from subsistence fisheries.

At present, FFA is providing assistance with fisheries regulations relating to offshore species. However, assistance is required in reviewing the fisheries act and regulations relating to inshore species. There is also interest in establishing a National Fishers Association.

There is a need to increase public awareness in relation to the need for fisheries management and regulations. Training in publicity and communications is requested for the present staff member in charge of the library.

One Marine Protected Area has been established by the environmental agency and training of fisheries staff for monitoring the area. was requested. Assistance is also required in establishing community-based fisheries management.

Vanuatu – 6 to 13 June 2003

Meetings with;

Department of Fisheries
Graham Nimoho, Principal Fisheries Extension Officer
William Naviti, Senior Resource Manager
Peter, Fisheries Extension Officer
William J. Morris, Fisheries Extension Officer
Wilson Yuri, Fisheries Extension Officer
Francis Hickey, Ethnobiologist/Fisheries specialist
Morgan Armstrong, Executive Director, The Foundation for the Peoples of the South Pacific; Vanuatu.

Key Points of Meetings

Are staff qualified? The 16 permanent staff of the Department of Fisheries (DoF) are well qualified to pursue actions to address the key problems identified in the SPC meeting in Fiji. The staff are highly motivated and work as a team. Self-reliance is a team policy that encourages them to make the best use of the limited resources available to them, and only seek outside assistance when it is absolutely necessary. However, it is obvious that DoF staff need to improve their expertise in their specific areas of work through in-country training and attachments to on-going programmes in other pacific island countries.

Structure of the fisheries agency: The 1993 public servants' association strike and the Comprehensive Reform programme in 1997/98 resulted in reduced staff numbers, the loss of programmes, and the closure of three extension centres on Shefa, Penama and Torba. The DoF structure is currently being reviewed in conjunction with the new fisheries legislation to be passed by the Parliament this year. Institutional strengthening has therefore become an on-going process where staff number has been increased and could increase further in the future.

Data and statistics: Adequate efforts are being made to collect data on coastal fisheries but focusing on the demersal snapper fishery and enforcement of regulations (fishing licences, etc.). DoF plans to expand the database to include other marine species and sociological information.

Fisheries regulations: DoF needs to review and up-date the existing fisheries regulations to meet new development and management requirements of the coastal fisheries sub-sector especially to support community management of fishery resources.

Encourage the involvement of fishers, communities and other stake-holders in fisheries management: The development of community -based marine resources management (MRM) in Vanuatu has been quite successful, with more than 80 communities are now reported to be engaged in MRM. It was initially developed by DoF and the communities in 1990 through the co-management of trochus and villagers were highly motivated and begun to introduce regulations controlling the harvest of many other species. The impressive results encouraged the spread of the idea to other villages with little or no outside encouragement. DoF acknowledges that the growth of the MRM program has been organic and low key, deemed to be an appropriate way of working locally. The success has also extended to the successful community management of marine turtles. To date, turtles are successfully protected in 80 communities involving 150 active monitors. The on-going programme that encourages the use of canoes in the subsistence fisheries in proving successful as well.

According to DoF staff, the success of MRM is based on the "bottom up" approach they use where communities' awareness of the importance of sustainable management of resources is enhanced.

MPAs: There are 10 MPAs operating in the country. Unlike MRM, most of the MPAs are not operating successfully. The problems are similar to the Solomon Islands' experience with MPAs. The basic problem is the imposition of a foreign (Western) concept of conservation, which contradicts the principles surrounding the local systems of use, not necessarily conservation, of the natural environment and resources on land and water that have been in existence in the country for centuries and effectively managed in traditional ways. MPA is restricted to marine areas and the resources within and thus differentiates it from the land. Its failure to integrate both land with marine based activities is a fundamental mistake that discourages active participation of communities, particularly when members are displaced from marine based activities in MPAs and there are no alternative land based activities to provide income and food.

The introduction therefore of MPA, although successful to a certain extent do not take the importance of utilising indigenous and local knowledge seriously and thus introduces elements of conservation that dilute ownership in the true traditional sense. It makes them feel that MPAs are owned by outsiders. The customary methods of use or conservation and ownership of the natural environment and resources both on land and the sea are deeply embedded in the social systems. Their application does not differentiate between the land and the sea. This is why gardening and fishing are carried out simultaneously as key livelihoods of coastal communities. It is also believed that the introduction of aquaculture such as seaweed farming as an alternative livelihood is widely accepted because it is seen by the communities as an extension of their farming activities from the land to the marine environment which they own.

DoF believes that in order to develop MPAs that work, indigenous and local knowledge must constitute the core of the approaches to strengthen the traditional systems that are already in existence. Like the MRM, the approaches must be beneficiary (community) driven and put emphasis on the integration of both land and sea based activities to provide alternative livelihoods and meet the essential basic needs of the communities.

There is also a need to replace the terms, "Marine Protected Area" with local terms that reflect the importance of local ownership of the model, land, aquatic environment and natural resources within. DoF feels strongly that it needs development funds to review the MPAs and develop new workable approaches.

Communicate with the public: There is a need to strengthen on-going awareness programmes implemented by the Environment Department, DoF and other stakeholders to maintain the progress of work on MRM and MPAs.

Addressing environmental problems: DoF with its vast experience in working with coastal communities welcomes and support the contributions of other stakeholders toward sustainable development and management of the natural environment and resources. It plays a strong leadership role in facilitating stakeholders activities.

Training: Given the staff shortage situation and the need to continuously improve staff expertise in their specific areas of work, it is important to: i) put emphasis on in-country short-term training (including on-the-job training) to keep staff absence from their normal day to day duties to a minimum; and ii) adopt the HRD approach to assess staff training needs systematically, develop and conduct training programmes accordingly. DoF benefits from the existing Government procedure for formal training outside the country.

Attachments: There is a need for DoF extension staff to be exposed to the on-going SPC Coastal Fisheries Management Programme on CBFM and CMT in other countries through attachments. Extension staff from other countries such as Solomon Islands and Papua New Guinea could also learn from Vanuatu's experience with MRM and conservation of marine turtle through attachments.

Technical assistance and development funds: There is a need for development funds and technical assistance to address the following:

- Strengthening of on-going awareness programmes implemented by DoF and other stakeholders;

- Review and up-date the existing fisheries regulations to meet new development and management requirements of the coastal fisheries sub-sector especially to support community management of fishery resources.

- Review the MPAs and develop new workable approaches.

- Human resources development (HRD) programme to: i) systematically assess the training needs of individual staff members in fisheries agencies; ii) develop training plans; and iii) develop and conduct the training programmes.

Wallis and Futuna – 24 – 29 May

Meetings with:

Bernadette Papilio of the Territorial Assembly.
Director Agriculture Fisheries/ Deputy director
Director, Cultural Services
Head of Statistics
Environment Association representatives
Director of Agriculture and Fisheries, Futuna.
King and Chiefs of Alo
King and Chiefs of Sigave
Federation of Associations representatives and some chiefs of Wallis.

Key points of meetings:

The Fisheries section is part of the Agriculture and Fisheries Department. At present there are no specialized fisheries staff in the section and this resulted in the lack of progress in the sector.

There are traditional structures in place to support community-based work on coastal fisheries, but most of these may be through the many associations in operation at the village level. These associations are at present dealing with issues related to agriculture, the environment, gender issues and fisheries. There was also a strong overlap in work emphasis in the different sectors in both territories, and environmental issues were especially identified as major factors in resource depletion. There is a need for assistance in setting up community-based coastal fisheries management.

Work has already started on the collection of data . The service can conduct surveys and collect data but there is a need for advice on specific areas to be addressed in the surveys. The need for coastal resource surveys and management was highlighted by the traditional leaders of Futuna. Work in Wallis had already started on the management (traditional) of a coastal area (mangrove area protection) in one village.

There are some fisheries regulations in place but these are not well known by the general community. There is a need for assistance on further development of marine awareness work that has already been started. Fisheries regulations are also outdated and there is a need for assistance in this area.

Interviewees stressed a need to work with other agencies to address coastal fisheries management. For Wallis and Futuna there can be no other approach - an integrated approach given the small island size and the inter-sectorial relationships and use of resources is needed. Fisheries in Wallis have access to vehicles and boats (fisheries owned), but Futuna does not have any vehicles or boats. No proper staffing in the absence of a department. Needs identified were in further specialised training of trainers (especially by sections such as aquaculture, training and development).

Annex 10.3. Key problems in coastal fisheries management. Results from respondents to the questionnaire survey.

KEY PROBLEM	Associated problems (causes?)	A.Samoa	Cook Islands	FSMicronesia	Guam	Fiji	Kiribati	Marshall Islands	Nauru	Niue	N.Marianas	Palau	PNG	Samoa	Solomon Islands	Tokelau	Tonga	Tuvalu	Vanuatu	# of countries	% of countries	Proposed solutions
delining	1a) inadequate or outdated fisheries regulations			■					■	■		■								4	22	revise regulations; zones; bylaws? SPC
fish	1b) non-compliance; poor enforcement of regulations				■	■		■	■	■		■							■	7	39	better awareness, enforcement; CBFM?
catches	1c) overlap between national, provincial, island councils						■						■						■	3	17	review legislation; collaboration; conflict resolution
	2) illegal fishing by foreign vessels											■								1	6	increased enforcement, penalties, confiscation
	3) overexploitation; overfishing; excessive fishing effort	■	■	■		■	■		■	■	■	■		■	■	■		■	■	14	78	management plans, regulations, CBFM, MPAs
	4a) overly efficient methods - night-diving with lights																■			1	6	ban or restrict use of lights for uw fishing
	4b) overly efficient methods - small mesh nets,				■				■								■			3	17	regulations; licenses for nets
	4c) overly efficient methods - hookahs, SCUBA,														■					1	6	resrict or ban use of SCUBA/hookah
	5a) destructive fishing methods - poisons, explosives	■		■		■								■	■		■			6	33	increase awareness and fines; use CBFM
	5b) destructive fishing - dredges, breaking coral, others						■								■					2	11	ban or restrict use of dredges
	6) shift from subsistence to commercial fishing				■														■	2	11	licenses for commercial fishing; FADs
	7) ciguatera fish poisoning									■						■				2	11	decrease pollution, protect habitats?
	8a) lack of agency capacity (res. mapping, assessment)		■					■	■			■	■					■	■	7	39	training for staff; socioeconomic data; HRD; SPC
	8b) lack of agency capacity (data collection etc)		■					■	■	■		■	■			■		■		8	44	training; database; use of schools; SPC
degradation	1) degradation, poor land management, siltation	■		■	■	■	■					■								6	33	restrict forestry, agriculture near rivers
of marine	2) sewage; water run-off				■					■	■			■						4	22	drainage improvement;
environment	3) fertilizers, pesticides, organic pollutants				■							■		■						3	17	restrictions on use; guidelines for disposal
including	4a) waste disposal; rubbish tips							■		■				■						3	17	waste management plan; awareness
coral	4b) disposal of oil products										■									1	6	improve oil waste management (recycling?)
reefs	5) alien and invasive species										■									1	6	controls on imports
	6a) uncontrolled or excessive coastal development		■								■			■						3	17	zoning; balanced development; EIAs; reserves?
	6b) destruction of wetlands, mangroves										■			■						2	11	restore wetlands; mangrove planting; CBFM
	6c) over-use of coastal zone; increasing tourism				■					■										2	11	education; awareness-raising
NOTES																				18		<< number of countries responding

Many questionnaire respondants listed "causes" of a problem rather than the "Key problem" itself; these are listed in column two of the above summary
For example, "shift from subsistence to commercial fishing" may be the cause of the more important (or key) problem of "declining fish catches"
KEY: MPA = Marine Protected Area; CBFM = Community-based Fisheries Management; SPC = assistance requested from SPC

Annex 10.4. Solutions and proposed actions from working groups at the Nadi meeting

Key Problem	Associated problems or causes	Solutions	Actions Phase 1	Phase 2	Phase 3	Phase 4
Fisheries-related problems						
1a) inadequate or outdated fisheries regulations	a) no capacity to review laws b) laws culturally insensitive c) lack of political support d) value of fisheries not appreciated	a) increase capacity b) review laws c) education, awareness. d) assess value of fisheries	a) Discussions with line agencies. b) Assessment of effect of outdated regulations. c) Awareness building d) awareness programmes	a) Identify capacity needs Consultation with government	a) Development/application Consultation with agencies on change in regulations	a) Implementation
1b) non-compliance; poor enforcement of regulations	a) high cost of enforcement b) penalties too low c) courts do not prosecute d) lack understanding of law	a) Reduce costs b) Amend legislation c) on-the-spot fines d) public awareness prog.	a) Increase budget allocat. c) reduce process time d) training/workshop	a) Coordinate with other agencies c) reduce to minor contravention	a) Public awareness	a) request assistance
2) illegal fishing by foreign vessels	a) Captain's ignorance b) Limited surveillance capacity b) commercial demands or motives c) No licenses or permits	a) educate the captains coupled with strong fines b) improve awareness and increase surveillance capabilities and awareness c) issue licenses and permits nationally/regionally	communicate to boat owners (through flag state) fishing access requirements and EEZ delimitations.	Request assistance from FFA		
3) overexploitation; overfishing; excessive fishing effort	a) lack of management plans b)technological changes c) high dependency on resource	a) prepare management plans b) apply regulations c) decrease dependency	a) establish MPAs with monitoring/enforcement b) improve enforcement c) increase awareness	a) apply regulations b) restrict some gear c) stock enhancement	a) improve legislation c) examine alternative	c) FADs, aquaculture
4a) overly efficient fishing methods - night-diving with lights	a) Requirements for income b) Minimum fine & cost c) Restore traditional fishing	a) find alternatives b) Apply regulations c) Apply regulations	a) training in other methods b) consult with stakeholders c) consult with stakeholders	a) eg - introduce FADs b) develop enforcement c) enforcement	Public awareness materials	Enhance community participation
4b) overly efficient fishing methods - small mesh nets,	a) Overharvesting b) Technology improvement c) Loss of breeding stocks	a) Improve regulations b) Improve regulations c) seek SPC assistance	a) Moratorium b) Legislation c) stock assessment	a) Stock assessment b) Awareness raising c) monitoring	a) Monitoring b) Monitoring	

Key Problem	**Associated problems or causes**	**Solutions**	**Actions Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**
4c) overly efficient fishing methods - hookahs, SCUBA,	Need to increase catch/income. Availability of diving gear	Total ban on unsuitable gear	Introduce regulations to ban use of gear	Enforce the new regulations		
5a) destructive fishing methods - poisons, explosives	Smuggling of explosives Availability of chemicals Lack of alternative fisheries	Establish rigid control Awareness campaign Create opportunities	Harsh penalties Training workshop Encourage offshore fishing (FAD program)	Secure storage sites multi-media campaigns Community aquaculture	Awareness programme Monitoring	Monitoring
5b) destructive fishing methods - dredges, breaking coral, others	a) ineffective management b) lack of awareness c) lack of alternatives	a) effective management b) increase awareness c) create opportunities	a) review existing status b) awareness campaign c) aquaculture	a) implement changes b) workshop with stakeholders c) offshore fishing (FADs)	b) publicity material	b) School curriculum
6) shift from subsistence to commercial fishing	a) technological innovation b) over-capacity	a) restrict gear & methods b) regulate capacity	a) develop regulations b) TAC, licensing, closed areas	awareness campaign	monitoring & enforcement	
7) ciguatera fish poisoning	a) destruction of corals by subsistence fishers, ship wrecks, channel clearing, reef blasting, sand mining And by tourists/snorkellers b) waste water, sewage	a)Reduce coral destruction b) Reduce contamination	a) Discussion with tourist associations, hotels, dive shops and construction companies b) discussions with relevant agencies	a) Prepare publicity material	a) Distribute publicity material – dive shops, airports, hotels etc	
8a) lack of agency capacity (resource mapping assessment)	Lack of qualified staff Limited funding for training	Seek SPC/aid assistance	Conduct training programme			
8b) lack of agency capacity (data collection etc)	a) lack of qualified staff b) lack of equipment	a) upgrade staff skills b) upgrade equipment	a) develop HRD program b) develop software, IT	workshops, training	attachments; in-service trg.	scholarships

Key Problem	**Associated problems or causes**	**Solutions**	**Actions Phase 1**	**Phase 2**	**Phase 3**	**Phase 4**
Environment-related problems						
1) degradation, poor land management, siltation						
2) sewage; water run-off	a) untreated sewage b) erosion c) bacteria	a) proper treatment b) land-use plans c) education/awareness	a) infrastructure b) stakeholder committees c) EIAs	a) water monitoring b) ICZM c) Publicity campaigns	a) contingency plans b) Awareness raising c) Monitoring	a) eg warning signs b) Monitoring
3) fertilizers, pesticides, organic pollutants	a) no controls on farming a) no management plan	a) control farming practices b) implement plan	a) discussions with farmers and fishers b) public awareness	 b) media campaign		
4a) waste disposal rubbish tip						
4b) waste/oil disposal						
5) alien and invasive species	a) Lack of enforcement & quarantine b) Loss of biodiversity c) loss of native species	a) build up capacity b) removal of alien spp c) preventative measures	a) training b) Awareness/ publicity c) improve quarantine	a) interagency cooperation b) Research c) stronger legislation	a) stronger laws/penalties b) inter-agency cooperation c) Awareness raising	a) Monitoring b) Monitoring c) Monitoring
6a) uncontrolled or excessive coastal development	a) soil erosion b) weak legislation c) loss of habitat	a) land use manag. plan b) strengthen legislation c) mangrove reseeding	a) Stakeholder committees b) request assistance c) ICZM	a) ICZM b) New controls/laws c) MPAs	a) public awareness camp. b) public awareness camp c) reef reseeding	a) monitoring b) monitoring c) monitoring
6b) destruction of wetlands, mangroves	Excessive development	Rehabilitation (replanting?)	Install requirement for EIAs			
6c) over-use of coastal zone; increasing tourism						