FIJI

SUSTAINABLE COASTAL RESOURCES MANAGEMENT FOR FIJI

A Background Paper prepared for the
Fiji National Workshop on Integrated Coastal Management:
April 9-11, 2002
Suva, Fiji

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I. INTRODUCTION

There are a number of important initiatives to address the sustainable development and conservation of coastal resources throughout the island countries and provinces of the Western Pacific, including the South Pacific, the Philippines and Indonesia. Coastal managers based in these sites unfortunately do not have the opportunity to share their lessons learned with each other, nor with government agencies at different levels. Yet such interaction is essential for the communication of ideas and lessons that can lead to the success of integrated coastal management projects.

A practitioner learning network is emerging in the region, primarily incorporating managers of conservation sites. This network of site managers recognizes that for their ambitious effort to be sustainable, lessons must be effectively communicated and integrated into the mainstream of government activities and programs. The Institute of Applied Science (IAS) at the University of the South Pacific (USP) is working in partnership with the University of Rhode Island Coastal Resources Center and the Government of Fiji to hold a workshop at the national level that will provide a valuable opportunity for exchanging information on lessons learned about successful site management to date. The meeting will also examine the potential for government and citizen support for a sustainable and replicable coastal program, and whether such an initiative is appropriate at this time for Fiji.

The overall project, funded by the David and Lucile Packard Foundation, incorporates an examination of experiences in two provinces in the central Philippines, and the nation of Fiji. This work will complement an on-going, similar initiative in North Sulawesi, Indonesia. All three locations have successful local site projects on-going and all recognize the need for more government involvement in linking together individual, site-based projects.

This paper provides important background information for the Sustainable Coastal Resources Management Workshop scheduled for April 9-11, 2002. Section I indicates the importance of coastal resources in the past, present and future well-being of Fiji. Section II points out that there are some important early initiatives as well as pending legal and policy proposals that reveal how many different groups and government offices are coming to similar conclusions about important next steps in creating a framework and viable local programs to care for coastal areas and communities. Section III examines the special area of the Coral Coast in more detail, a region which shares many of the problems and concerns of other coastal areas, including small outlying islands. Several important initiatives are described as well as how coastal management might look in Fiji at this scale. The final section offers some reflections on possible directions for Fiji to consider taking in the near and medium term.

II. FIJI IS A COASTAL NATION

A. Coastal Resources are an Important Basis for Stability and Sustained Growth

Coastal areas are of vital importance to Fiji society and its national development. Most of the urban centers and a vast majority of villages are located on the shore, along with much of the population, agriculture, industry and commerce. Income from tourism and fisheries is directly tied to the condition and productivity of critical ecosystems and shoreline features such as coral reefs, beaches, seagrass beds and mangroves.

The Fiji Strategic Development Plan for 2002 – 2004 (August, 2001 review draft) produced by the Ministry of National Planning focuses mainly on short term measures for "rebuilding confidence for stability and growth" in Fiji. However, this document also looks ahead by clearly stating that:

> "Government's commitment to sustainable economic growth means that growth must not be allowed to lead to the long term degradation of the environment." [para. 34] Further, "The proper management of the environment and sustainable use of its natural resources is critical for the sustainable development of Fiji's largely natural resource based economy" [para 12.67].
>
> Marine resources need to be managed "in a way that maximizes resource owner and community benefit whilst ensuring bio-diversity and conservation issues are taken fully into account" [para 9-30].
>
> Finally, "Protecting the environment is closely linked to disaster management and mitigation. The effects of many disasters (e.g. floods) can be reduced by taking better account of the environmental risks of development" [para. 34].

The Environment section of the Strategy also mentions the need for minimizing the degradation of natural resources, enacting the Sustainable Development Bill, and raising public awareness on environmental issues.

This section reviews the importance of the coast to the traditional village and rural life of Fiji, its role in sustaining the current economy, and further contributions toward sustainable development of the country.

i. Traditional Economy

Around 90% of Fiji's 800,000 people may be considered coastal dwellers. Despite increasing urbanisation 54% of the population is rural (Leslie and Ratukalou 2001). Local communities, especially in rural areas, are still heavily dependent on subsistence utilisation of natural resources for their livelihood.

Agriculture

Subsistence agriculture contributes between 30-40% of total agricultural GDP and is of significant importance to local villages and communities. Subsistence agriculture is practiced all over Fiji and based upon a mixture of staple root crops (dalo, cassava, yams, sweet potato) and tree crops (bananas, breadfruit, mangos and other fruit trees) and vegetables. It provides a source of nutritional benefits and through the selling of surplus crops, income (MAFF 1999).

Fisheries

The inshore fishery is of vital importance to the rural sector. Most of Fiji's coastal villages and settlements rely on subsistence fishing for a large part of their protein intake, however, there is a lack of detailed information on this fishery. If the estimated volume of the subsistence fishery could be sold at current domestic prices it would be worth nearly F$50 million (Watling and Chape 1992). In 1999 it is estimated that 17,800 metric tonnes (finfish and non-finfish) were caught and consumed by subsistence fishermen. This volume represents twice the size of the artisanal fishery (MAFF 1999).

Mangrove Resources

A large proportion of Fiji's coastal villages have access to and utilise mangrove areas. These communities have a significant dependence on mangroves. Mangrove areas provide crabs, prawns, fish, molluscs and other fisheries as well as an important source of firewood, building materials, dyes, medicines and a variety of other uses. The direct and indirect benefits are free and self-sustaining thus are important determinants of the quality of life of many coastal communities (Watling 1985).

ii. Existing Economic Sectors

Fiji's economy is largely dominated by sugar and tourism although private investment has continued largely in construction, tourism, other agriculture, forestry and the garment industry. The dependence of Fiji's economy on natural resources and the environment is still an overriding feature. Most of the socio-economic activities are located on the coast including tourism, fisheries, agriculture, industry, and infrastructure.

Tourism

Tourism, which is mainly private sector driven, has grown significantly over the years and has now become Fiji's largest gross foreign exchange earner. The tourism industry is highly focussed on the western region of Fiji in Nadi, the Mamanuca Islands, and the Coral Coast, and has great potential to deliver economic benefits to rural Fijians.

In 1999 it contributed approximately 16% of GDP and 22% of foreign exchange. Tourism provides employment directly and indirectly to around 40,000 people. The sector relies heavily on the state of coastal areas and proper management of coastal uses. Recently, a number of new hotels have been built in the country and most of the major resorts are situated on the coast. Ecotourism is also an important and growing form of tourism. Visitor arrivals have recorded a

steady growth reaching a record level of 409,000 in 1999 then declining to 294,070 in 2000 as a result of the coup. Visitor arrivals have begun to increase again in 2001 in which they reached 348,014 (Ministry of National Planning 2001).

Agriculture

Agriculture accounts for the largest sector of Fiji's economy, accounting for 43% of foreign exchange and contributes 19% of Fiji's GDP. It provides around 40% of total employment (MAFF 1999). The main agricultural activities are concentrated on Viti Levu and Vanua Levu where much of the suitable land is under cultivation for commercial crops such as sugar cane and subsistence crops. There is limited land suitable for expanding agricultural opportunities.

Sugar is still the backbone of the agricultural economy with annual production in 2000 at 0.33 million tons. The industry generated sales revenue in excess of $280 million in 2000. It is also responsible for the employment of around 25% of Fiji's labour force and contributed around 14% of total of foreign exchange (Ministry of National Planning 2001). Root crops and yaqona are expanding as export crops. Production of dalo for export in 1999 was 8058 tonnes earning $8.8 million. In 1999, 245 tonnes of yaqona were exported. (MAFF 1999).

Commercial Fishing

In 1999 the domestic commercial catch of fresh and frozen finfish was around 5102 tonnes worth $16.9 million and for non- finfish approximately 4870 tonnes worth $6.2 million. Main species caught include several inshore finfish species, mangrove crab, prawns and bivalves.

In 1999 it is estimated that $F87.5 million worth of sashimi tuna and $7 million of loin product were exported to mainly Japan and United States markets. PAFCO exported canned and loin tuna to the value of $F15.9 million. Export of aquarium fish was worth $519,000. (MAFF 1999).

Manufacturing

Manufacturing is now a significant part of the economy contributing 15% of GDP and employing around 28,000 people. Main components of the sector are textiles, clothing and footwear, beverage and tobacco production, food processing, and wood-based industries. The textile, clothing and footwear industries experienced major growth in 1999 contributing around 25% of total exports, however output fell sharply in 2000 as a results of the political crisis (Ministry of National Planning 2001).

iii. Future Economic Growth and Sustainable Use of Coastal Resources

The Fiji Strategic Development Plan for 2002 – 2004 sets the stage for future investments in infrastructure, capacity building and resource management which need to be in place to take advantage of opportunities while also improving quality of life and avoiding degradation of the environment over the long term.

Tourism is a sector which is now recovering and has good growth potential. One part of the vision is to link tourism with other parts of the economy including horticulture, floriculture, fisheries and aquaculture" [para. 10.8]. For example, success in the fresh tuna export trade depends on the availability of international flights to market destination [para 9.24].

There is untapped potential for the development of small and medium scale businesses by indigenous Fijians for the tourism industry such as handicrafts, ecotourism ventures, diving, and other water sports. "Community-based tourism projects that are well designed and managed can bring about substantial economic benefits to the local population, particularly to the resource owners. In addition, ecotourism also promotes the conservation of Fiji's biodiversity, indigenous Fijian culture and tradition, and the natural environment" [para 10.13].

Development of the fisheries sector could include export of an expanded variety of fresh fish, cultured seaweed and other marine products such as giant clams and cultured black pearls. The sector is expected to grow 1.7-2.5% given the expanding tuna industry and the provision of fishing equipment. Some of the investment barriers include limited shore based facilities and rural infrastructure and there is a key concern about the need to improve how marine products are handled to avoid losses, and to permit Fiji to benefit from a greater number of value-adding steps and processes (Ministry of National Planning 2001).

Diversification of high value niche crops and traditional food crops is also needed as sugar cane production declines. Rural to urban migration "has resulted in significant urban development and encroachment onto first class arable land" as well as generated a number of spillover problems such as water pollution, draining of wetlands and flooding.

B. Fiji's Coastal Habitats and Ecosystems are of National and International Significance

Fiji's coastal environment is made up of an assemblage of resources including coral reefs, mangroves, beaches, and forests. These resources form the basis of Fijian culture, employment, and food supply and therefore need to be well maintained for future generations (Strategic Plan). In addition, tourists travel thousands of miles to enjoy Fiji's National Heritage.

Coral Reefs

Coral reefs are found associated with all the islands of Fiji. There are approximately 1000 coral reefs in Fiji and many types exist including barrier, fringing and platform reefs. Two types of barrier reefs are found: oceanic ribbon reefs that enclose lagoons or areas of normal sea and which are entirely oceanic such as the Great Sea Reef which extends for over 200 km; and barrier reefs which are separated from the mainland by a relatively narrow lagoon such as off Suva. Exposed fringing reefs are found from Natadola to Serua , southwest Viti Levu. Platform reefs are common inside the Great Sea Reef of the northern coast of Vanua Levu (Watling and Chape 1992).

Apart from providing protection to the coast and serving as a critical habitat, coral reefs also provide a number of products to the economy and local population in Fiji. These include fisheries including trochus and beche de mer, coral, and handicrafts such as jewelry.

Fiji's reefs are considered to be in good condition except those near the large urban centres which are subject to urban pollution, heavy gleaning, and coastal development. Most reefs are moderately to heavily fished. Reefs near villages are subject to subsistence and artisanal fishing and this has caused reduction of target fish species, giant clams, trochus and beche de mer in many areas. Many reefs also are affected by crown of thorns starfish outbreaks and coral bleaching. In urban areas pollution from sewage waste, industries, and poor land use has also impacted the reefs. Outside urban areas pollution is confined to immediate vicinity of tourist resorts and villages. Coral harvesting also occurs for use in septic systems, curio trade, and aquarium trade. Fiji is currently the second largest exporter of live reef products for the marine aquarium trade. Impact and sustainability of collection are an ongoing topic of debate (Cumming *et al*. 2002).

No formal or established system of MPAs exists to date in Fiji. However, a growing network of village-managed MPAs is in place and is based on Fiji's strong tradition of customary marine tenure. Various NGOs, research groups and private-sector operators are working together to raise marine awareness and promote establishment of MPAs (Cumming *et al*. 2002).

Mangroves

The extent of Fiji's mangroves is around 42,000 hectares (385 sq km). Nine different species of mangroves exist in Fiji (Watling and Chape 1992). Just over 90% of the mangroves are on Viti Levu and Vanua Levu, with the largest stands located in the deltaic areas of the Rewa, Ba, and Nadi Rivers on Viti Levu and the Labasa River on Vanua Levu (Ellison In Press a). The Ba, Labasa, and Rewa deltas combined support 28% of the national resource, however, they are lightly affected by development pressure (Gray 1993). The Suva-Navua mangroves and the Nadi Bay mangroves are, on the other hand, considered the most threatened because of their location (Watling 1985).

Fiji's mangrove flora is relatively simple consisting of four exclusively mangrove species, a unique mangrove hybrid, and four predominantly mangrove species. It is dominated by three 'true mangroves' from the family Rhizophoraceae: *Bruguiera gymnorrhiza* (**dogo** in Fijian), *Rhizophora stylosa* and *Rhizophora samoensis* (both **tiri**).

Mangroves are extremely important to local communities that utilise mangroves for a range of uses such as firewood, construction materials, tools, medicines, dyes, and other products. They are also important for the sustenance of coastal fisheries , the principal recipients being the coastal users. Mangrove-associated molluscs, prawns, crabs, mangrove lobsters, and around 70 species of finfish are commonly caught in mangrove areas and sold at local markets or on the roadside throughout Fiji (Lal 1991). Mangrove areas are also important for fuelwood production, shoreline protection, areas for sewage processing, and areas for science and education.

Most mangrove areas are in fairly good condition except around urban and peri-urban areas where they are heavily utilised for subsistence use. Major threats are future reclamation and development, overexploitation, and pollution (Watling 1985). A management plan was drawn up in 1985 and is referred to by the Lands and Survey Department when assessing applications for reclamation of mangrove areas. Approximately 18,019 ha of mangroves are included under forestry protection forests (Department of Forestry 1997).

Seagrass Beds

Many seagrass beds exist throughout Fiji; within reef system five species of seagrass have been identified. However, there has not been any inventory of extent. Seagrass beds apart from their ecological importance such as nurseries for juvenile fish, provide areas where local communities glean for shellfish and other marine organisms. Fiji in 2001 became a part of a Global Seagrass Monitoring Program, SeagrassNet, and has set up a site off Suva that will be monitored for two years.

Beaches & Dunes

Beaches are found off many of the coasts of the larger islands of Viti Levu and Vanua Levu except where the major river deltas are located. They are most well developed where there is a fringing reef to provide carbonate material and limited input of sediment. Beaches are also found on most shores of the smaller islands. They are especially important for the tourist industry. Being a highly dynamic environment, beach erosion is continually occurring.

The only major accretion of sand forming dunes is at the mouth of the Sigatoka River.

Coastal Forests

Coastal forests are well developed on the wet sides of the Viti Levu and Vanua Levu and on the high smaller islands. They provide local communities with a source of firewood, construction material, medicine, garlands and food. Tourists also utilise the coastal forests and the mountains behind the coastal plains for hiking or to visit waterfalls. They also provide ecological functions such as shade, protection from wind, sand and salt spray, erosion and flood control, and soil improvement. Common important species found in these forests include *Cocos nucifera* (coconut), *Hibiscus tiliaceus* (vau), *Pandanus tectorius* (vadra), *Calophyllum inophyllum* (dilo), *Morinda citrifolia* (kura) and *Inocarpus fagifer* (ivi) (Thaman 1991).

C. Coastal Areas are Threatened by Overuse and Degradation

The Fiji Strategic Development Plan for 2002 – 2004 identifies a number of issues of serious concern for the country as a whole, including:

- The loss of biodiversity
- Inappropriate solid waste management
- Mismanagement of chemical wastes
- Pollution of air and water ways
- Land degradation
- Modification of sensitive habitats
- Unsustainable exploitation of living and non-living habitats
- Climate change
- Increase in the number of invasive plant and animal species which threaten Fiji's native species

These issues are largely the result of increasing coastal populations, rapid coastal development, and increasing utilisation of coastal resources and have resulted in various impacts on coastal environment including soil erosion and land degradation, loss of habitat and biodiversity, and degradation of near shore habitats (Pitman et al 2001). This has been aided by the absence of a unified environmental policy in Fiji.

Causes of degradation of coastal habitats include inappropriate agricultural activities, mining, sewage pollution, inappropriate solid waste disposal, fishing activities, use of destructive fishing practices, beach sand mining, building of jetties and groynes, commercial harvesting of coral, soil erosion and siltation, improper disposal of industrial waste, and natural hazards such as climate change and sea level rise and hurricanes. The absence of consistent monitoring of the coastal zone makes it difficult to assess the extent and pervasiveness of pollution and degradation in Fiji (Fiji Tourism Development Plan).

Agricultural Activities

The expansion of agriculture in marginal hills and steep areas and inappropriate land use practices have led to soil erosion and land degradation which has an adverse effect on food production potential and on coastal areas as a result of siltation (Ministry of National Planning 2001).

Overfishing & Overexploitation of Stocks

The overexploitation of inshore fisheries is now becoming a concern, particularly the selling of undersized fish and crustaceans and cutting of mangroves. This is thought to be a result of poor education and short-term monetary gain (Ministry of National Planning 2001).

Sewage & Other Types of Pollution

The main sewage problems occur in urban (and is some cases rural) areas that are not sewered. Widespread seepage of waste from septic tanks into creeks leads to increased nutrients in coastal waters, potentially damaging reefs and seagrass beds and increased risk of disease. Insufficient treatment and inappropriate siting of sewage outfalls has also led to unacceptably high faecal coliform levels in some areas (Watling and Chape 1992).

Effluent from sugar mills contains sugar and soil and has a high BOD (organic matter which uses oxygen dissolved in water as it decays). This results in reduction of dissolved oxygen levels in receiving waters causing damage to the environment including fish kills. Effluent from industries in urban areas such as food processing factories, breweries, and paint manufacturers also discharge effluent into coastal waters reducing water quality (Watling and Chape 1992).

Solid Waste Disposal

Not a single refuse dump is currently managed to acceptable standards and all are located in coastal areas, often in mangrove areas. Solid waste is also commonly thrown into waterways and coastal waters (Ministry of National Planning 2001).

Soil erosion

It is clear that high rates of erosion are occurring (Watling and Chape 1992). A study conducted in 1998 provided quantitative soil loss for the Rewa, Ba, Sigatoka and Nadi watersheds. It was found that soil loss was between 2.2 mm/year (Rewa watershed) to 5.4 mm/year (Nadi watershed) (Leslie and Ratukalou 2001b).

Climate Change and Sea Level Rise

The impacts of climate change are likely to affect agriculture, coastal, and water resources. Coral bleaching has been widespread in Fiji waters since 2000 due to high ocean temperatures. Sea level rise would increase the risk of flooding and inundation of coastal areas (Ministry of National Planning 2001).

III. FIJI IS RESPONDING TO THE COASTAL MANAGEMENT CHALLENGE

A. All the Key Actors Recognize the Value of an Integrated Approach to Coastal Management

The Strategic Development Plan incorporates a number of concerns for coastal resource condition and sustainable use

The Environment section of the current Strategic Development Plan sets out three strategies for helping Fiji move ahead: raising public awareness and changing public attitudes on environmental issues, enforcing existing legislation, and enactment of the Sustainable Development Bill, which sets out a much-needed comprehensive framework for policy, planning and decision-making including the preparation of a policy paper and implementation strategy for coastal management.

According to the Strategic Development Plan, much needs to be and can be done in the medium term to address the interconnected issues of rural-urban migration [para. 5.4], reducing the backlog of water and sewage infrastructure projects [Executive Summary para 14], land development decisions [para. 5.5] and near-shore marine resources [para 9.26]. This highlights the interrelationships among these issues, and implies the need for the sectoral agencies to work closely with each other and with the cities, towns and villages most affected by the problems.

Coastal management has been proposed as a crucial part of Fiji's environment policy and management capability since 1992

Among the early examples of an integrated approach to addressing the problems of overuse of coastal resources can be found in Watling's 1985 Mangrove Management Plan for Fiji .

Coastal management as a term and a necessity was featured in the 1992 Environment, Fiji: The National State of the Environment Report by Watling *et.al*. Since its publication Fijian and regional environmental policy analysts and advocates have devoted a decade of hard work in order to identify issues, suggest policies and recommend implementation options for environmental management and biodiversity conservation of which coastal management is included.

Recent legislation and studies reinforce these early conclusions

Fiji as a signatory of the international Convention on Biological Diversity has committed itself to an integrated approach to coastal management. The need for integrated coastal management is clearly recognized within the Sustainable Development Bill with it listing Integrated Resource Management Policy as the first of seven required national policies, and a Sustainable Coastal Management policy at the top of the list of elements within that overall topic.
The National Biodiversity Strategy and Action Plan is the first of the policy statements to be prepared as called for by the Sustainable Development Bill, and closest to making its way through the Government of Fiji review process. This focuses on conserving the genetic, species

and ecosystem diversity of the country. The guiding principles and many of the measures required to put the policy in place encompass site-based integrated coastal resources management.

The Climate Change Vulnerability and Adaptation Assessment also recommends a number of coastal management measures to enable Fiji to successfully address the wide ranging impacts foreseen in the climate change scenarios. These include carefully considering a range of coastal protection options, including discouraging development in high risk areas.

B. Positive Steps taken in Selected Areas Demonstrate the Potential for Successfully Addressing Fiji's Coastal Development Challenges

i. Introduction

Many commendable efforts have already been taken to address coastal issues in Fiji, even without the full benefits of a consolidated national environmental legal and administrative framework. Although sometimes small in scale, lessons may be learned from these coastal efforts as well as models being tested for other natural resources in Fiji such as forestry and watersheds. Some of these efforts are summarised here. There are others as well as new projects about to commence.

ii. Summary of Existing Programs

Locally Managed Marine Areas

A great deal of work is currently taking place in Fiji with coastal villages toward the establishment of Locally Managed Marine Areas, or LMMAs. These are defined as marine areas for which a management plan has been developed by a village or group of villages, usually including a no-harvest area. The concept draws upon the strengths of the community-based approach to resource management and traditional practices. These 'tabu' areas are not part of any formal marine protected area designation under national law.

The need for such programs evolved in the last decade because of the increasing belief among regular marine harvesters in many areas of Fiji that marine resources are in decline.

Macuata
As early as 1992 traditional Fijian chiefs in Macuata closed their fishing grounds in an attempt to counter this perceived decline due to overharvesting. Such an intervention was based on the Fijian tradition of closing a specified reef area in times of stress such as the death of a chief. Seasonal bans during breeding times are also practiced. More recently there have also been restrictions placed on the types of technology used (gill nets, spear guns).
Verata, Tailevu
The results of the Macuata experiment were not monitored and for some years there was no systematic work in communities to address the problem of declining subsistence marine resource stocks. In 1996, work began in Verata Tikina with the University of the South Pacific and local

group SPACHEE supported by a United States government program known as the Biodiversity Conservation Network. A series of environmental awareness activities were held at both the village and tikina levels. In a subsequent tikina meeting the following actions were approved:

- suspension of issuing commercial fishing licenses to outsiders
- ban on turtle and coral harvesting
- limit on size of gill nets used (minimum 3 inches)
- ban on use of "duva"
- consideration of declaring "tabu" marine areas

These decisions were strongly encouraged and supported by the traditional chief, na Ratu mai Verata, and reported to the Tailevu Provincial Council Meeting.

A subsequent two-week workshop in Verata systematically assessed threats to marine environment health and developed further actions to meet them such as pollution monitoring and reduction and the declaration of a sea-grass bed and coral reef "tabu" in one village, Ucunivanua. An innovative aspect of the workshop was to train participants to monitor indicator species identified by the community, for example "kaikoso" in villages with extensive sea-grass beds. The monitoring results, which have shown a roughly 300% annual rise in "kaikoso" in the "tabu" areas and 100% annual increase in nearby harvested area, have been reported to tikina meetings and encouraged other village to establish "tabu" areas. There are now nine "tabu" areas covering several important marine species in Verata.

Ono, Kadavu

During this period people in Ono, Kadavu had approached various marine conservation groups about their interest in declaring a portion of their reef that contained two deep "blue holes" as a marine park. The South Pacific Program of the international Worldwide Fund for Nature (WWF) has worked with the people of Ono to assess the biodiversity in the proposed area and to seek formal governmental declaration of a marine protected area.

Cuvu Tikina, Nadroga

In 1999, the Foundation for the Peoples of the South Pacific introduced the Coral Gardens project to help communities in Fiji rehabilitate degraded coral reef habitats. The initial project area is Cuvu tikina in Nadroga province and includes working with a major resort. A Tikina Environment Committee has been formed and a number of activities have been undertaken to address threats including the declaration of four “tabu” areas.

Namara, Tailevu

The Women in Fisheries Network is also working on marine conservation in the Namara area of Tailevu province and has held workshops on marine conservation that will likely lead to the development of "tabu" areas.

Other sites in Fiji

Reports of the successes these projects has attracted interest in other Fijian villages and in government departments. Many villages have approached agencies to assist them in the declaration of "tabu" areas while others are undoubtedly taking initiatives on their own. Workshops have been held in the Votua area of Ba and in Gau which have led to the establishment of "tabu" areas. Discussions have also been held in Namatakula/Navutulevu/ Naboutini/Votualailai villages in Nadroga/Serua about declaring "tabu" areas. Many of the villages in these areas are already planting mangroves with the assistance of OISCA/USP/SPACHEE to improve their marine resources. The four villages of the Muaivuso Peninsula on the far side of Suva Harbour have also held discussions and have asked for a marine management planning workshop to be held. A similar stage has been reached in work in Tikina Wai in Nadroga with WWF. Other international organisations such as the Marine Aquarium Council and the International Marine Alliance are also operating in Fiji and interested in this concept of locally-managed marine areas.

Collaborations with tourism resorts

Another important actor in marine protection is the tourism industry. The Fiji Divers Association has been active and certain resorts such as the Cousteau Resort and Namenalala are well-known for their efforts. Resorts are also seeking ways to work with nearby communities to establish protected areas in Beqa and Kadavu.

Department of Fisheries involvement

The Fisheries Department took an active role in these efforts and extension officers have often taken part in workshops. This has led to the establishment of a community-based conservation section in the department and convening of an action group to discuss how best to integrate LMMA work into a national governmental effort.

The learning network

Such efforts in Fiji and elsewhere in the Pacific have attracted international interest and funding to help these initiatives as well as a new effort to encourage different agencies to work together to learn about how best to implement locally-managed marine areas. USP is the regional focal point for this project and in 2001 facilitated the establishment of a discussion/action group called Fiji-LMMA.

Members of the different agencies meet regularly to discuss their initiatives and also form work teams to jointly execute workshops previously done single-handed by the individual groups. The team held meetings in Nakasaleka tikina and Daku, Kadavu in October, 2001 and the latter village has also established a 'tabu" area. Similar discussions have also taken place in Gunu village, Naviti, Yasawas.

The groundswell of effort to help communities better manage their marine resources is heartening. Its breadth of actors and their willingness to work together suggest that, given a conducive regulatory environment and focused use of resources, a major turn-around is possible in the decline of the inshore marine resources. As government moves toward return of regulatory control of "i qoliqoli" to their "i taukei" the presence of an organised network to assist village, tikina and provincial authorities to make responsible marine resource utilisation decisions will be especially critical.

Tourism Forum Environment Sub-Committee & Coral Cay Project

During the 2000 Fiji Tourism Forum an Environment Sub-Committee was appointed to discuss environmental issues related to tourism. The committee was made up of representatives of government agencies, NGOs and the private sector. Three resolutions were outlined for the sub-committee to action. These were:

> *Resolution 1* - The implementation of the Coral Cay Conservation Programme
>
> *Resolution 2* -That all development proposals involving exploitation or extraction of natural resources are discussed in open forums with representation of all stakeholders and results of EIA are made public
>
> *Resolution 3* - Priorities lie in development of environmental protection laws and policies and environmental education for stakeholders

The Coral Cay Conservation project is led by Coral Cay Conservation Ltd. (CCC), a private scientific tourism expeditions firm based in Great Britain. They have released a very detailed report where volunteer divers surveyed marine habitats in the Mamanuca Island group, an area west of Nadi. The project was carried out with the collaboration of the Ministry of Tourism, which has a specialist working on these projects in order to advance the Tourism Development Plan, and the Fiji Visitors Bureau. However, the Coral Cay leaders admit, "the community work completed during the pilot phase of the MCRCP was inevitably limited", which was a key concern expressed about the outsider-driven approach.

CCC was invited in 2001 by stakeholders in the Mamanuca Islands to implement a pilot project with the aim of collecting information on marine life in the Mamanucas. Data were gathered from a wide range of geographical locations and habitat types using baseline transects to map habitats and Reef Check methods to assess reef health. The project showed a range of detrimental human related and natural factors that would reduce the attractiveness of reefs to tourists. These included a mass coral bleaching event that occurred in 2000, storm damage, and crown of thorns starfish infestations. Human related impacts included sedimentation, coral damages from divers or anchors, increased nutrient load, collection of aquarium species and litter. Most of the sites surveyed have been significantly impacted and are currently in poor condition using coral cover as the criterion.

Recommendations made relating to the conservation and sustainable management of the reefs include the establishment of multiple use marine protected areas, the establishment of a Mamanuca Coastal Zone Management Group, conservation education programs, and a program to monitor reef health and fishing activities. The Ministry of Tourism has subsequently signed with CCC for the second phase of the project to start in 2002.

Guidelines for Good Logging Practices & Sustainable Forestry

A Fiji National Code of Logging Practice was developed in 1990 by the Department of Forestry and includes guidelines to reduce environmental impact of forestry activities. It comprises of recommended widths of buffer strips on the sides of water courses, seasonal logging restrictions, and fire precautions. It also includes advice on planning for logging operations, operational requirements, and safety requirements. This is now being revised as monitoring of activities indicate that some forestry activities are still having negative impacts on the environment.

The Research Division of the Forestry Department also designed and implemented the Natural Forest Management Pilot Project which aimed at improving guidelines for indigenous forest management and involving forest owners more in management decisions and practices. The project was carried out between 1991 and 1994 near Nakavu village, Namosi Province. The project was used to illustrate to forest owning communities, the timber industry and government the practicality of sustainable logging and natural regeneration. Various field activities were carried out including the training of landowners in various aspects of implementation of forest management.

A management scheme was then proposed containing a list of operations which are recommended for logging. These included:

- Demarcation of logging area and compartments
- Implementation of pre-harvest inventory (a new step)
- Decision on logging and logging intensity
- Selection and marking of trees for controlled selection logging (only part of the total volume is cut & not only removal of best trees)
- Design of road system
- Preparation of logging/management plan
- Implementation of controlled selection logging
- Supervision and compartment closure until the next cut (prevents current practice of relogging areas only a few years after first cut)

Landowners benefit because the new scheme has a more stable income from royalties, logging jobs and management jobs. They also actively participate in the pre-harvest inventory, tree selection and logging from which they become more aware of sustainable forest management. In addition the selective cutting and improved logging practices leave the forest structure more intact leading to a better supply of culturally important non-timber products and improved quality of creek water and most probably less soil runoff (Vlelter 1995).

Landuse Planning

The Land Resource Planning and Development Department of the Ministry of Agriculture has been involved in land use planning as part of a sustainable forestry/sustainable land management project in Drawa, Vanua Levu, an area of virgin forest. The project is the operational phase of the sustainable forestry management guidelines developed at Nakavu. A Sustainable Forest Management Working Committee was set up and included representatives from the Forestry Department, GTZ (Pacific German Regional Forestry Project), Land Use Planning, NLTB, FAB,

Department of Environment, Landowners Committee, Cooperative Department and Fiji Forests Industry. The Land Use Planning Section is assisting in the land use planning particularly for increasing commercial agricultural use of land for the planting of dalo and yaqona , a major cause of deforestation. They are also responsible for creating awareness on sustainable farming methods.

Field operations commenced in 1999 with boundary demarcation and pre-harvest inventory by landowners. Participatory Rural Appraisal workshops have already been carried out in the area to determine the needs and wants of the local communities. The workshops revealed a common goal of the Drawa block landowners, the participation of landowners in all stages of the logging operations of their forests and the need for training and awareness. Community awareness has also been conducted as well as business training of landowners. Sustainable forestry and land use management plans are currently being formulated by stakeholders (Fung 2001).

Inshore Fisheries Management

The Fisheries Department has recently established a Conservation Unit which will work with communities to help them manage their marine resources and establish marine reserves. It already manages a marine protected area around its research station in Makogai. It also assists other marine projects with the replenishment of fishing areas with depleted resources such as trochus and vasua.

The Fisheries Department has also completed a FAO funded project on the survey of selected traditional *i qoliqoli* (fishing areas). The main objective of the project was to enable the department to strengthen inshore fisheries management by enhancing the role of the traditional *i qoliqoli* system. By strengthening the traditional system of fisheries management it will lead to an increase in participation of communities in the fisheries sector, strengthen their capacity to manage fisheries, enhance food security and improve the social and economic position of the traditional *i qoliqoli* owners. The study used six fishing areas to assess how the traditional *i qoliqoli* system of management could strengthen inshore fisheries management. The fishing areas surveyed include Bua (beche de mer exploitation), Tavua (dynamite use), Malomalo (coral harvesting), Galoa (live fish trade), and Kiuva (seaweed farming).

It was found that most of the subsistence fishing was carried out by women and the small-scale commercial fishing often by the men. Commercial fishing was conducted inside *i qoliqoli* boundaries by license holders by diving or using gillnets. The amount of money paid by commercial fishers to obtain the 'letter of consent' from the *i qoliqoli* owners, however, is not standard and ranged from FJD$50 to FJD$1,000. Most people indicated a decrease in marine resources in their fishing area, however, few had knowledge of marine management techniques apart from declaring a tabu on an area. Due to lack of awareness of national fisheries regulations, adherence to these rules was selective. Although most villages had Fish Wardens, they lack the resources to monitor fishing activities. Except for two of the villages that had village committees to make decisions on matters pertaining to their *i qoliqoli* there seemed to be little consultation between the villagers and those concerned with the management of their marine resources. Most villagers felt that village-level management plans formulated with consultation of all *i qoliqolqi* members would be the best way to improve their ability to manage their *i qoliqoli* (Langi *et al.* 2002).

Further to this study, the department is planning a scientific study of the marine ecosystems, marine habitats and fisheries resources that exist in all of the 410 *i qoliqoli.*

ii. Emerging Lessons

Lessons can be learned from these coastal efforts as well as these models tested for other natural resources in Fiji. These ongoing projects demonstrate a number of attributes which contribute to their success in addressing coastal management. Some of these attributes include:

1. Utilizing a participatory approach
2. Incorporating capacity building
3. Recognizing and addressing community concerns, including those beyond the immediate focus of the project
4. Establishing a positive partnership between the community and "outsiders" such as NGOs, international agencies, university community, national government, departments, and the private sector
5. Building upon a foundation of good information and combining local knowledge with science
6. Incorporating a livelihood component into the project

For each of the projects described in section ii, the degree that each attribute was satisfied was estimated on a scale of 1 (small amount) to 5 (large amount). These are summarised in Table 1. below:

Table. 1.Summary of the degree to which each project satisfies each attribute

Coastal Management Project	*Participation*	*Capacity Building*	*Community concerns*	*Partnerships*	*Good Information*	*Livelihood component*	*Awareness raising*
Locally Managed Marine Areas	5	4	4	5	4	3	4
Tourism Environmental Workshops	3	2	3	4	3	3	4
Coral Cay Project	2	2	2	4	4	2	3
Sustainable Forestry/Land Management Project	5	4	4	5	4	4	4
Inshore Fisheries Survey	3	1	3	2	3	2	3

In addition to these ongoing projects there are also projects which are about to commence. The Department of Environment is about to commence the International Waters Programme (IWP), a five year programme funded by GEF and coordinated by SPREP, and carried out in 14 Pacific Island Countries. The program will focus on integrated coastal watershed management and will involve the implementation of a pilot project in each country that addresses sustainable resource management and conservation issues in the coastal zone and should be community-based. Each project will seek to strengthen capacity and provide lessons for best practice and appropriate methodologies for sustainable resource management.

C. The Various National Proposals to Address Fiji's Coastal Environmental Challenges have not yet led to an Effective Response

i. Introduction

The past decade has generated a number of important, overarching assessments and proposals which potentially complement the many efforts to address coastal environmental issues in villages and within individual economic sectors in Fiji. More recently, an increasing number of ministries and departments have sought to become more involved in national-local collaborations. Further progress is needed at the national legal framework and administrative levels to create a solid basis for enabling the most promising approaches and examples to be applied more widely throughout the country and more consistently across all of the sectors which need to contribute to conserving coastal ecosystems and wisely developing coastal resources.

In addition, very little has been done by government to integrate environmental considerations into the economic planning process. The current decision-making process involves the sectoral development of policy papers that go through Central Planning office. If the policy has economic implications it must be first considered by the Economic Strategy Committee, which has emerged as the key policy formulating committee (Figure of present decision-making framework). The decision-making process has thus dealt almost exclusively with economic issues without the integration of social and environmental issues. As a result the focus has been on short to medium term development policies and strategies which creates a bias against the environment because they do not take into account environment protection which is visible only in the long-term (ESCAP Report 1998).

ii. The National Integrated Coastal Management Initiative is set within a Broader Environmental Framework

The continuing debate on creating an environmental policy framework for Fiji is greatly enriched by the action oriented projects described in Section II B which are able to overcome this lack of policy. The number and diversity of local initiatives and pilot projects gives Fiji a rich source of information about how tangible progress can be made. However, Fiji has not enacted framework-enabling legislation or have the full complement of institutional resources for successful environmental policy, planning, regulation, and implementation.

Many good studies have been carried out and policy proposals developed, but relatively few of these have reached the stage where needed approvals and resources have been mobilized to put the recommendations into action.

Mangrove management

In 1985, a Mangrove Management Plan for Fiji was prepared, which contains a characterization, policies and maps of mangrove location, types, and use zones for the main islands including Viti Levu, Vanua Levu, Ovalau, Gau and Kadavu. This document is still used for decision-making on foreshore reclamation of mangroves by the Lands and Survey Department.

The National State of the Environment Report for Fiji
This key document prepared in 1992 remains the most recent and most referenced overview of environmental trends and issues. It has not been updated, although more recent information on many of the specific topics is available and have been compiled as sectoral databases. A separate volume containing a proposal for national environmental policy was also prepared at the time, and led eventually to the preparation of the Sustainable Development Bill. The report, The National Environment Strategy for Fiji, includes an institutional analysis which was accompanied by a more detailed assessment and proposal for a new environmental law.

The Sustainable Development Bill
These proposals are embodied in the "Sustainable Development Bill" the original version of which was completed in late 1996. The Department of Environment coordinated the development of the original Bill, however, it has been extensively reviewed and reworked. The current strategy is to enact the less controversial components first and these have been combined and are under final review. Even though the entire Bill is still far from adoption, most national administrative departments and experts use this as the *de facto* environmental management framework for Fiji.

Among the main provisions of the proposal which are of particular importance to coastal resources management, the Bill calls for the establishment of a National Council for Sustainable Development and the creation of 13 national policy statements, including "sustainable coastal management".

Each ministry will be required to create its own environment management unit to formulate the policy statement, a natural resources inventory and resource management plan for resources under its jurisdiction, and conduct internal environmental audits. Firms with more than 50 employees must create environmental committees.

A formal legal framework for conducting environmental impact assessments (EIA) will be created. Currently such reports are voluntary. A list of projects subject to an EIA includes many types of coastal development. It also requires that any commercial or industrial class of facility that discharges or generates pollutants must adopt a Code of Environmental Practice. The facilities must then periodically submit environmental audits to demonstrate compliance. A corps of Environmental Inspectors would be appointed to enforce codes and requirements.

An Environmental Trust Fund would be created to support debt for nature swaps, biodiversity programs, studies and plans. The Bill also proposes creating an Environmental Register to publish documents, public notices and codes of environmental practice. In addition, national "state of the environment" reports would be produced, and an overall National Environment Strategy and a National Resource Management Plan will be formulated. Coastal resources would be featured in these documents.

A National Resources Management Unit is to be created that would prepare and maintain a national resource inventory including a Coastal Sensitivity Analysis and a national resource management plan which identifies appropriate uses for all natural resources, including "the conservation of biodiversity" and "the maintenance and enhancement of coastal areas, natural streams, rivers and water supplies".

Concern has been expressed about the feasibility of establishing such a modern public administrative structure for environment, with its budgetary and administrative implications. A study by the United Nations Economic and Social Commission for Asia and the Pacific, ESCAP (1998), states:

> ….the almost insignificant government funding of the Department of the Environment clearly shows that the environment still holds a rather minor position in national development priorities. The Department of the Environment needs to be adequately staffed, both in numbers and qualifications, otherwise there will be little point in proceeding with the Sustainable Development Bill.

The Sustainable Development Bill includes relatively few references to the provincial and local structures where some of the promising tangible steps in sustainable management are currently underway. Fortunately, a number of ministries are already placing increasing emphasis on community- based approaches in areas of critical concern.

Integrating Environmental Considerations into Economic Decision-making.
Even more recently (1998), the United Nations Economic and Social Commission for Asia and the Pacific, ESCAP, prepared an analysis on the Integrating Environmental Considerations into Economic Decision-making Processes at the National Level in Fiji. The report recommended that for government to effectively integrate environmental concerns into economic decision-making a combination of revised institutional and legal instruments with a comprehensive system of economic incentives, disincentives and educational and public awareness program need to be implemented. The implementation of the Sustainable Development Bill was considered a critical starting point.

The report also discusses examples of intersectoral conflict, especially land use conflicts, probably the most widely recognised example in Fiji. Because of the lack of a national land-use master plan prime agricultural land has often been wasted on developments such as housing and industrialisation when poorer agricultural land could have been used.

iii. Selected Sectors are Now Beginning to Address Key Coastal Management Issues in Partnership with Local Entities

The management of coastal resources in Fiji naturally involves many government agencies (Appendix A). In the absence of an overarching framework, at times responsibilities may seem to be overlapping or conflicting. Fiji's successes to date appear to have been achieved through activities in some of the sectoral programs. The Sustainable Development Bill draft continues being used as an *ad hoc* framework, with various departments already working to prepare policy proposals that will be required under the draft bill.

The Tourism Department, Department of Environment and Land Resources Planning and Development Resource Planning Department have already drafted statements based on the Bill, and the Department of Environment prepared a proposal to initiate a programme to conserve biodiversity. The April 2002 workshop will also be a step in this direction.

Ministry of Tourism

The Fiji Tourism Development Plan 1998-2005, prepared by the Ministry of Tourism and Transport of Fiji, Deloitte and Touche, and the Tourism Council of the South Pacific calls for the adoption of the Sustainable Development Bill and for establishing a coastal zone management program. It is an example of a government department taking into account sustainability and the importance of the environment when developing a plan for an economic sector. The plan identifies weaknesses and hindrances to the tourism industry as well as opportunities for improving tourism in the country and actions that should be taken.

Actions that should be undertaken include:

- Establishment of Tourism Development Areas where land ownership issues have been resolved and development is planned appropriately
- Development of new resorts using Fiji style of design
- The government facilitating private investment
- Preservation of the environment through the Sustainable Development Bill and development of a set of environmental standards for hotels and resorts
- Strengthening of the Ministry of Tourism and Transport and Fiji Visitors Bureau
- Closer collaboration within government departments that play a role in tourism

The plan also emphasizes the need for proper planning for tourism expansion and the development of guidelines including :

- Review of current planning legislation such as that within the Town Planning Act that provides regulations for density, minimum site area, building height and parking for different locations and types of accommodation
- Coastal development requirements such as the 30 meter set back from High Water Mark for all coastal developments
- Requirements for developers regarding sustainable water supply, proper surface drainage, proper sewerage system, waste disposal methods, electricity supply and energy efficiency, and road access
- Need for Environmental and Social Impact Assessments for developments

- Appropriate architectural, landscape design and site planning

A whole section of the plan is assigned to conservation and environmental protection due to the industry being closely linked to the state of the natural environment. Recommendations include:

- The proper disposal of sewage to protect coastal waters
- The introduction of a Green Code that would encourage the improvement of environmental standards of tourism operators and provide a marketing bonus to those resorts that subscribe to it. The Green Code would aim to avoid waste, promote proper waste disposal methods and the conservation of water and energy
- Reviewing the carrying capacity of small island resorts
- Strict enforcement of planning procedures for hotels and resorts
- Public awareness campaigns creating awareness of the fragility of coastal areas
- Integrated Coastal Zone Management so that cross-sectoral issues can be addressed
- The establishment of marine parks that tourist could access

The Ministry also has developed the Fiji Ecotourism and Village-based Tourism Policy and Strategy for Fiji which provides a platform for the development of small and medium tourist enterprises by indigenous Fijians. The document addresses the increasing demand for ecotourism, the need to involve more rural communities in tourism, the need to reduce negative economic and socio-cultural impacts of tourism, and the promotion of environmentally friendly forms of tourism. It also provides principles for ecotourism development in Fiji so that activities occur in a more coordinated manner. Recommendations for implementation of the policy include the formation of an Ecotourism Committee, the development of standards for ecotourism developments, incentives for ecotourism development, and the need for integrated planning at the village level.

Department of Land Resources Planning & Development, Ministry of Agriculture, Sugar and Land Resettlement

During 2001, a National Rural Land Use Policy Statement was prepared by the Department of Land Resources, Planing and Development following a review of rural land use in Fiji. This was recommended by many previous documents as a priority of Fiji since there is no existing rural land use policy or national land use plan. The lack of a rural land use plan is a major constraint for wise resource allocation and management in the rural sector and is of critical importance as it covers all land based resources such as forests, minerals, rivers and streams, and agriculture. In addition, the current administrative and institutional framework responsible for resource allocation and management is highly sectoralised and coordination between agencies is lacking. These factors have constrained the development process and in many cases promoted unsustainable resource use.

The aim of the rural land use policy is to manage land for sustainable uses, balance production and protection, create diversity and leave an enhanced heritage for future generations. The primary rural land issues were summarised as:

- Population increase has placed pressure on the land resulting in land degradation and soil erosion
- Soil loss rates are well above what is economically acceptable

- Because of poor application of land husbandry practices the impacts from natural disasters such as droughts and flooding are becoming increasingly more acute
- Serious under resourcing by Government for line ministries responsible for land resources
- Poor awareness of the interdependence of conservation and development

The adoption of a rural land use policy that incorporates multiple-use between agriculture, forestry, tourism, biodiversity conservation, urbanization etc can avoid planning conflicts and act as a standard and guide on which to make more effective decisions. One of the principles of importance when developing a policy is that land use decisions are based on whole watershed land management planning.

Within the statement various national policies are proposed including:

1. Increased public awareness that land resources are interdependent and must be managed in an integrated way and responsibility of individuals and communities for preventing land degradation
2. A regulatory framework for the protection and sustainable management of rural land resources

Other recommendations arising from the review study which led to the policy include:

- The establishment of a National Land Use Council to oversee all aspects of land resources development and management at the national level
- The establishment of land use planning groups at the provincial or divisional level that would operate at an intermediate level between land husbandry committees and national government (Leslie and Ratukalou 2001).

Department of Environment

The Fiji Biodiversity Strategy and Action Plan, FBSAP, was prepared through the Department of Environment and is the result of the work of six technical groups, six community workshops and a steering committee. The strategy focuses on conserving the genetic, species and ecosystem diversity of the country. It has six areas of focus:

- Community support – awareness, involvement and ownership
- Improving our knowledge
- Developing protected areas
- Species conservation
- Control of invasive species
- Capacity building and strengthening

The strategy observes that Fiji has only a 'rudimentary' system of protected areas and that it is time to create a 'Sites of National Significance Program' that would provide legal protection and establish management plans. It also reiterates the need to build human and institutional capacity:

> The current administrative framework for biodiversity conservation in Fiji is poorly developed with ill-defined responsibilities, a lack of capacity and severe funding constraints.

The FBSAP envisages a major `step-change' from the current predominantly passive approach based on resource management for extractive purposes with little inherent biodiversity management capacity, to an active, `hands on' management with adequate domestic technical capacity.

Recognizing the importance but limitations of external donor funding of the initiative, the FBSAP envisages the Government's main initial contribution will be:

- to endorse the FBSAP as Government's policy on biodiversity planning and management
- put in place the required legislative and administrative framework
- to develop a national capacity for biodiversity management with trained specialists and
- to address the issues of a rapidly increasing requirement for recurrent funding for biodiversity management.

Finally, the proposal recommends moving away from the 'command and lead mode' and recognizes the role of provincial authorities, civic organizations, land and fishing rights owners and the private sector. It builds upon existing initiatives, listing 104 ongoing and new projects to carry out 19 objectives.

Because Fiji is a signatory to the UN Framework Convention on Climate Change it is obliged to provide a National Communication document that includes information on climate change vulnerability and adaptation implementation policies and strategies. These requirements were supported by the Pacific Islands Climate Change Assistance Programme (PICCAP) based at the Department of Environment, thus a Climate Change Vulnerability and Adaptation Assessment for Fiji was carried out using Viti Levu as a case study. A number of personnel were involved in the assessment including SOPAC, the Departments of Agriculture and Lands, and USP.

This document provides information and data on the implications of climate change on four sectors: agriculture, coastal resources, human health and water resources. Anticipated impacts of climate change and sea level rise on the coast of Viti Levu include:

- shoreline erosion
- increased storm damage and flooding
- salinity intrusion into water tables
- increased salinity of rivers
- disappearance of wetlands and
- possible reef destruction due to increased sea surface temperatures.

Adaptation strategies identified include :

- improved understanding of coastal dynamics through data collection exercises and monitoring programs. Structural or bio-engineered coastal protection projects require site specific data and analysis before being considered
- examination of coastal protection options for reducing erosion risk
- land use planning
- protection of mangroves and reefs which are a natural protection system
- adequate pollution control, to prevent reef die-off
- use of setbacks from the shoreline and low-lying areas in the construction of buildings and

- mangrove replanting in degraded areas.

iv. Conclusions

It seems clear that many of the ingredients needed for building Fiji's capability to sustainably manage its coastal resources are close at hand. Fiji's major issues are understood well enough to justify key decisions and set priorities for the near and medium term. Site based initiatives and overall policy proposals are well articulated, and the follow-up work of a number of ministries are all providing some direction toward a practical approach. The absence of a formal legal framework is not a major hindrance for making some significant progress in the near term.

Not all of the conditions needed for progress are present in the right amount. Most of the projects which are underway on the ground reflect donor or funder priorities and interests, rather than being shaped by an overall Fijian strategy to cover all of the priority needs. While there may be a number of useful projects underway, these seem to be single purpose and opportunistic. There is not yet a unifying focal program within a Fijian program that has sufficient core funds to enable it to leverage and shape the direction of the many potential sources of assistance.

A number of actors within the government sector are demonstrating their willingness to carry out collaborative activities. It is likely that everyone would benefit from initiatives that provide the catalyst and reasons for different sectors to work together. Such activities could be designed then used as the basis for fund raising and buy-in by a range of donor groups.

The following section uses a specific example, the Coral Coast of Viti Levu, to help explore why and how a common agenda and unifying framework for meeting the coastal management needs of a province might be formulated.

III. HOW MIGHT COASTAL MANAGEMENT WORK IN FIJI? THE EXAMPLE OF THE CORAL COAST

Why use a case study?

One of the emerging conclusions from the work in specific places as well as the national policy proposals and assessments is the value in preparing plans and solving problems using ample community and stakeholder involvement. This means that many of the specific policies and implementation actions will need to carefully reflect local conditions, aspirations and capacity. A complementary conclusion is that an overarching legal framework is required to back up site based decisions with fairness, transparency and the rule of law, as well as technical and human resources that a village or tikina by itself could never mobilize.

The question becomes one of discovering how this might work and what path can be followed starting right now to build up these respective local and national capabilities, while work proceeds, hopefully at a quicker pace, to set the needed supporting legal and administrative mechanisms in place.

Coastal resources are very important to the current and future development of the Coral Coast. The reef ecosystem and shore offers an exceptionally important natural environment which has value for traditional use forms, the current economy and for innovative sustainable uses that can continue to contribute to social and economic well-being. The issues faced in the area are salient to villagers, investors, visitors, fishers, researchers, non-governmental organizations and public agencies, thus there is a constituency for new ways to address and solve problems. A variety of efforts are already underway to address individual concerns, as well as several good examples of collaboration across agencies, communities and economic sectors, as well as among the levels of government. It seems well worth the effort to look closer at this special area to see how efforts to solve its problems might lead to the discovery of mechanisms and processes that could be fruitfully employed throughout the country.

A. The Coral Coast Presents Many of the Issues as well as Promising Solutions for Achieving Sustainable Forms of Coastal Resource Use

The Coral Coast represents an almost full range of coastal issues encountered in Fiji, for example tourism, improper methods of disposal of solid waste, sewage pollution, depletion of fisheries, coral harvesting, coastal erosion, storm surge and flooding, siltation of rivers and coastal areas as a result of soil erosion inland, some agriculture and forestry, and sand mining. It also represents an area with a wide range of experiences in environmental planning and management; many environment-related workshops have been held in many of the villages, marine protected areas have been set up in one tikina, waste management projects have been undertaken, mangrove replanting efforts are fairly widespread, the issue of coastal erosion has been addressed in one village, and some of the hotels have been involved in environmental clean up campaigns and monitor their water and environment for pollution.

These efforts provide in miniature a compilation of available information about resources, issues, current interventions and successes, and proposals for action for a geographic area that can be used as a basis of a National Policy Paper.

The Coral Coast (Figure 1) is situated on the south western coast of Viti Levu and is the longest chain of fringing reefs in Fiji. It is a major tourism area with a number of large hotels and smaller tourism operators spread out along the coast. It encompasses the coastal areas of the province of Nadroga-Navosa from the village of Navutulevu through till the Fijian Hotel at Rukurukulevu village.

Figure 1. Map of the Coral Coast

Sigatoka town is the main commercial centre for the coastal residents and inland ones, who live mainly along the Sigatoka River which is about 80 km long. Its population in 1996 was 7,862 increasing by 5.1% since 1986 (Bureau of Statistics 1998). It also houses the provincial government, hospital and several primary and secondary schools.

Access to Sigatoka and the Coral Coast was only possible by boat until a circum-Viti Levu gravel road was built during World War II by the United States Army which had extensive training camps near Sigatoka. This also was the first major exposure of most people in the area to foreigners other than a few missionaries and civil servants.

The second major change to the area was the coming of tourism. Korolevu Beach Hotel (now closed) about 30 km east of Sigatoka, opened in 1959 and the Reef Hotel and Fijian Hotel within the next decade. The Naviti and Hyatt Regency (now Warwick) opened in the early 1970's. Two more modest resorts, Hideaway and Tabua Sands, opened in the 1980s along with the Crow's Nest in Korotogo residential area, which also houses several small-scale tourist accommodation facilities. The Fijian Resort has over the years greatly expanded its facilities as did the Reef (Outrigger) in the late 1990s. This latter project also involved the rerouting of the Queens Highway island for about two kilometres along the Korotogo coast and realignment on the seaward side of Korotogo village. The growth of tourism has changed life along the Coral Coast from a mainly subsistence one of farming and fishing to a mixed income subsistence lifestyle.

The tarsealing of the main road in the early 1970s made travel to Nadi and Suva much more convenient. Sigatoka town expanded considerably at about this time with new shops and movie theatres, but except for some tourist shops, has returned to its sleepy nature since then. A new sports stadium and modern bridge across the Sigatoka River are recent developments.

The Sigatoka sand dune area, which has been declared Fiji's first National Park, is a major tourist attraction. Another tourist attraction is the Tavuni Hill Fort, a fortified site occupied by Tongan immigrants to Fiji and located a few miles inland from Sigatoka on the east side of the river. The Kula Bird Park is located in a valley inland from the Outrigger Reef Resort. The Kalevu Cultural Facility built near the Fijian Resort, an attempt by the Fijian resort landowners to further benefit from tourism, has had an "up and down" history. A major government ecotourism effort, Waikatakata, including waterfalls and hot springs inland from Votualailai failed due to land disputes. There are also a few small restaurants along the coast and a village dive operation.

Besides tourism, agriculture is an important industry with vegetable farming in the Sigatoka Valley and sugar cane near the coast. Vegetables are sold to the municipal markets, to hotels, and in the larger cities. The sugar cane is transported by light rail to Cuvu, where the local company offices are, and then to Lautoka for milling. Industry is almost non-existent, there is a small juice-making facility in Sigatoka town and a coconut furniture-making facility near Naevuevu village.

B. "Sun, Sea, Reefs"

The Coral Coast has a number of physical characteristics which make it attractive to tourists as well as local populations. These include a mile climate, a variety of natural habitats, and a number of interesting natural and cultural features. There are few constraints to developments, such as cyclones.

i. Climate

Temperature is relatively consistent due to the ocean ranging from a low of 18^{o}C during the coolest months (July-August) to a high of 32^{o}C during the warmest months (January and February) . Rainfall is highly variable and mainly orographic often falling in heavy, brief local showers. In addition, Fiji experiences a distinct wet season (November to April) and a dry season. Annual rainfall for the area is expected to be between 2000 and 3000 mm. The predominant winds are the trade winds from the east to southeast, which are generally light to moderate in strength. Tropical cyclones which occur from November to April can cause high winds and have caused widespread damage in the area in the past (Pitman et al 2001).

Storm surge, which is a temporary rise in the level of the sea caused either by very low atmospheric pressure that causes the water level to rise or the piling up of water against a coast driven by strong winds (both associated with cyclones), occur on the Coral Coast. The most recent was in early 2001 which resulted in flooding of coastal areas and damage as a result of

huge waves. It is recommended to design infrastructure for protection against inundation at a level of 3.3 metres above mean sea level to protect against a 1:50 year event (Reidel and Byrne 1989).

ii. Natural Habitats

Coral Reefs

The well developed fringing reefs of the Coral Coast extend almost unbroken for 63 km and have a seaward extension of 500 to 1000 meters. The only major gap is at the mouth of the Sigatoka River. Where creeks descend from the hills the reef is broken by passages of 100 to 300 meters across (Coral Reefs of the World). The fringing reef has a shallow tidally submerged platform which is interspersed with moats and channels. Beyond the platform is a consolidated reef crest. The shallow lagoon-like nature of the reef-flat permits snorkeling at high tide. The reefs at Cuvu, Korolevu, Namatakula, Komave and Malevu have been described in detail by Morton and Raj (1980).

Beaches & Dunes

The reefs are backed by beautiful white carbonate sand beaches. The unconsolidated sediments making up the beaches are a mix of terrigenous, calcareous and other shallow water marine sediments. Active sand transport is mainly due to the west and longshore drift (Pitman et al 2001).

At the mouth of the Sigatoka River, terrigenous sands have built up into high dunes where scenic and educational walks are done.

Lagoons & Coastal Waters

Along the Coral Coast the lagoon is fairly narrow due to the 200 meter isobath being only around 1 km offshore. Average depth of the lagoon is around 2 meters making it suitable for swimming, snorkeling, and fishing. Bathymetric surveys conducted by SOPAC indicate that the passages and reef areas can attain depths of around 200m that drop to around 800 meters offshore. Water temperature is always above 20^{o}C with summer maximum around 30^{o}C. Tides are semi-diurnal with neap tides having a mean range of 0.9 m and spring tides 1.3 m (Ryland 1981).

Marine water quality is fairly good. Few studies, however, have been carried out along this stretch of coast. Studies by USP conducted in the lagoon offshore from the Outrigger Resort indicate that nutrient levels often are higher than acceptable limits and faecal coliform levels at times may exceed acceptable levels after heavy rains, especially at the mouths of creeks and nearshore waters.

Mangroves

Mangroves are present only adjacent to a few villages along the coast to the east of Sigatoka. Votualailai, Tagaqe, Vatukarasa, and Korotogo have mangrove areas and mangroves were reported to be present adjacent to Namatakula, Komave, Navola, and Malevu in the past. Mangroves are more commonly found to the west of Sigatoka and occur in the villages of Yadua, Naevuevu, and Rukurukulevu.

Creeks & Rivers
Streams and rivers dissect the coast in many sections along the Coral Coast.

Coastal Forests
The coastal areas east of Sigatoka front the Southern Coastal Range of mountains where coastal forest occurs. A logging concession area, Navutulevu, is active in the Coral Coast area. In 1997, 3,608 m^3 of timber was harvested from the area.

iii. Natural & Archaeological Features

There are a number of natural features along the Coral Coast that are attractive to the tourism industry. These include limestone caves in several places, waterfalls at Biausevu and inland from Votualailai and also hot springs near the latter waterfall. There are also a number of archaeological sites such as the lapita pottery within the sand dunes and Tavuni Hill Fort near Sigatoka.

C. Village Life and the Tourism Economy

i. Villages & Population Characteristics

Within the Coral Coast area being studied are 4 coastal tikinas. These include Komave, Korolevu i Wai, Conua, and Cuvu. Within these tikinas are around 18 coastal villages and an additional 4 settlements. The largest village is Cuvu with 560 people and the smallest is Sila with 73 people.

District	*Village*	*Population*
Conua Tikina	Korotogo	380 (2002)
	Malevu	203
	Vatukarasa	450
Cuvu Tikina	Yadua	336 (1999)
	Rukurukulevu	249
	Sila	73
	Tore	106
	Naevuevu	324
	Cuvu	560
	Hanahana	89
	Voua	350
Komave Tikina	Komave	200 (2002)
	Navola	100
	Vucilevu	158
	Namatakula	300
Korolevu i Wai Tikina	Votua	260 (2002)
	Votualailai	154
	Tagaqe	260

All residents of these villages are indigenous Fijians. There is also a tikina of 8 villages close to Sigatoka town, which is about two kilometers from the river mouth. Settlements at Korotogo, Votua, Cuvu, and Korolevu have built up mainly to house people working in the tourism industry. The Indo-Fijian population along the coast is concentrated in the sugar cane growing area from Korotogo to Cuvu and the town of Sigatoka (population in 1996 was 7862).

Most of the indigenous people are Methodist by religion. In the 1995 provincial profile of Nadroga province 73.4% of the population were Methodist, 8.6% Catholic, 8.3% Assemblies of God, and 5.8% Seventh Day Adventist.

All the major villages have a village nurse. In most of the villages, many households still utilise pit toilets as compared to septic tanks. Only in Vucilevu and Votua did most households have septic tanks.

Between Namatakula and Sigatoka there are 3 village primary schools, one in Namatakula (Ratu Filise), one in Navola, and one in Tagaqe (Tagaqe District School). There are also several primary and secondary schools in the Sigatoka and Cuvu areas. Literacy rate is very high.

ii. Utilities

All the major villages between Namatakula and Sigatoka have electricity supplied by the Fiji Electricity Authority, although not all houses have electricity, and piped water. The 8 major villages west of Sigatoka all have electricity and piped water.

Transportation is by road either by bus or carrier. The major Queens Highway that links Suva with Nadi runs parallel to the coast and through or fairly near most of the villages on the Coral Coast. The highway was upgraded and sealed in the 1970s.

In almost all villages a few households have telephones and a few have video sets. Radio is probably the most widespread means of communication. TV transmission was extended to the Coral Coast in 1994.

iii. Economic Sectors

Tourism

The Coral Coast is one of the major tourist destinations in the country. It began with the opening of the Korolevu Beach Hotel in 1959 and experienced significant growth in the 1970s after the sealing of the Queens Highway. Along the Coral Coast there are 7 major hotels/resorts and a number of smaller guesthouses and backpacker accommodation. Dispersed between these tourist developments are villages. These villages own land on which the resorts/hotels are located, are employed at the hotels, often provide entertainment at the hotels, and some host tourists in their

villages. In many villages, at least one member of each household will be employed in the tourism industry. Thus tourism is the main income earner and economic activity on the Coral Coast for the local indigenous people. It provides financial benefits and leads to an improved standard of living. The resorts often provide assistance to villages when needed.

Fishing

The fringing reefs are important sources of subsistence fish and shellfish for all the coastal villages, however very few are involved in commercial fishing. A survey of the subsistence and artisanal fisheries in Namatakula village in 1993 estimated the frequency of fishing in the village. It was estimated that 28 people fished 3-7 times/wk, 22 people 1-2 times/wk, 4 more than once a month, and 7 less than once a month. The length of a fishing trip ranged from 0 to 4 hours and the habitats most fished were the outer reef edge, inner lagoon, estuary and on the edge of the mangroves. Methods most commonly used were spear, handlines, collecting and gill nets. Target species included emperors (*sabutu, kabatia*), octopus, rockcod, trochus, Siganids, Carangids, prawns, the mangrove jack, crescent perch, and parrotfish (Rawlinson et al. 1994), *kabatia, kawakawa, sabutu,tivitivi, sevou, ta, ulavi, kasala, kawago, cawaki, kanace, kuita, damu, donu,nuqa, salala,* and *parrot fish.* The only villages that issue licences for commercial fishing are Komave (1), Vatukarasa (1) and Korotogo (3). Namatakula and Namada sell their excess fish.

Coral Harvesting

Coral harvesting is carried out in 3 villages along the coral coast. In Komave it is limited and only individuals sell the coral to Walt Smith International. In Namada coral harvesting is extensive, starting back in 1998 and is a main income source with households earning around $200 per week. In Vatukarasa it is also extensive. Both villages sell the coral to Walt Smith International, a company based in Lautoka.

Land Use

The logging and planting of hardwood continues today in the forested inland areas of Tikina Korolevu i Wai. In the 1970s a sawmill was in operation inland from Tagaqe.

The land along the Coral Coast is mostly hilly with only small areas of agriculture potential. People in the villages have small plantations mainly of root and tree crops that meet their subsistence needs. The Sigatoka Valley, however, extends about 80 km inland and has fertile plains which are under intensive use by small-scale vegetable and sugar cane farmers earning it the name the “Salad Bowl of Fiji”. Sugar cane is also planted starting to the west of Korotogo village, mainly by Indo-Fijian lease holders. Around 20% of the employed villagers in Cuvu tikina work in the cane farms.

Mineral Extraction

Limited sand and gravel extraction is carried out within a number of villages including Namatakula, Komave, Votualalai, and Vatukarasa. This is mainly used to construct houses and seawalls. In the past extensive gravel extraction occurred at Tagaqe Village and presumably others to upgrade the Queens Highway in the 1950s, 1960s and 1970s (Pittman et al 2001).

D. Coral Coast Issue Profile

As part of this project a survey of coastal villages from Namatakula to Korotogo was undertaken. Major findings from this survey and a review of information on Cuvu tikina villages are highlighted in the sections that follow.

i. Environmental Issues: Resource Degradation

Coral Harvesting
Coral harvesting for the aquarium trade occurs in 3 villages in the study area. Live rock (reef rock covered with coralline algae and associated fauna and flora) is removed from the reef as blocks 15-35 cm in diameter usually by iron bars. Collectors gather from areas predetermined by the chief. Impacts of coral harvesting includes breakage of non-target species, potential destruction of coral population, potential reduction of reef topography and conflicts with tourism operators.

Deterioration of Coral Reefs & Overfishing
Death of coral is a problem encountered by many of the villages. The main causes are thought to be siltation from upland erosion, sale of coral, and flooding and freshwater input. Fish abundance is reported to be declining in some villages and some intertidal species are becoming rare. The use of traditional fish poisons may also be a factor. In the villages of Cuvu tikina, the decline in abundance of marine life is also attributed to the use of undersized nets, illegal fishing by outsiders, and modern fishing methods such as diving and spearfishing.

Deterioration of Coastal Water Quality
Deteriorating water quality seems to be a major concern for many of the villages and is often blamed on the nearby hotels disposing of their solid waste and sewage waste into the ocean. However, the continued dependence of most of the villages on pit toilets and septic tanks out of which sewage waste may leach during heavy rains and the location of pig pens close to the ocean in many of the villages probably also contributes to sewage pollution in the coastal waters.

Coastal Erosion
Coastal erosion is one of the more serious concerns for the villages along the Coral Coast at present, especially for those east of Sigatoka. All villages except Namada and Korotogo, both of which have the highway between the village and the shore, indicated that coastal erosion was a major problem especially during storm surge. These storm surges damage existing seawalls, wash away houses, and cause extensive erosion of shoreline.

Pollution
The disposal of rubbish in the village and on the coast is mentioned in all villages. This is mainly plastics, tin cans, and other non-biodegradable solid waste. Due to there being no formal rubbish collection villagers often dispose of rubbish along the coastline assuming that the ocean will remove it. Siltation is also a problem in Namatakula, Komave, Navola, Tagaqe, Vatukarasa and Korotogo especially during heavy rain. Votua and Votualailai also mentioned that the disposal of

rubbish from nearby hotels and sewage disposal from the Votua Housing via a small stream are a major cause of pollution in their coastal waters.

Overgrowth of Algae
The overgrowth of algae, especially *Sargassum* species, is mentioned to be a problem in all villages east of Sigatoka except Votua, Votualailai and Korotogo. The excessive growth of algae smothers coral and is thought to be due to elevated nutrients in the waters, siltation, and higher ocean temperatures.

Logging
Logging is still carried out upriver of Komave, Navola and Votua villages and on the slopes above Tagaqe and Namada. The logging is primarily pine and is thought to be a major cause of soil erosion. Deforestation and burning were also problems in Cuvu tikina.

Flooding
Flooding during heavy rains is another major concern of the villages along the Coral Coast. In two villages, Votualailai and Korotogo, the construction of the Queens Highway has contributed to the flooding in the village. In Korotogo the road is higher than the village and inappropriately constructed culverts lead to flooding in the village during heavy rain.
Other Problems
Other issues include piped water becoming dirty during heavy rain, the depletion of fish in Sovi Bay and nearby rivers as a result of sand extraction, the use of chemicals for prawn and eel fishing, and the loss of mangroves and coastal forests.

ii. Socio-economic Issues

Crime
The level of crime in areas along the Coral Coast has increased over recent years, especially in the area between Malevu Village and the Korotogo area. This area has a number of hotels and resorts fairly close to several villages. As a result of the increasing crime a police post was built in Korotogo. The business community have also become involved in curbing crime by involving the local youth in sports. For example the Outrigger Resort last year sponsored the Navosa rugby team (Verebalavu pers. comm.).

Social changes of tourism
Apart from the negative impacts tourism may have on the environment such as pollution of coastal waters from hotel sewage and chemical waste, tourism also has negative social impacts on local communities on the Coral Coast including changes in cultural attitudes, reliance on hotel employment rather than pursuing education, and new diseases. In Cuvu tikina the increase in the number of villagers employed at the hotel has led to a change in diet as a result of people buying food from the store as compared to the past where food was obtained from the ocean and forests. Of course, tourism also provides extensive employment opportunities and a large amount of money to the owners of hotel leases.

iii. Institutional & Legal Issues

Conflicting coastal resource management options
The absence of cross-sectoral planning often leads to conflict among coastal resource uses. A common intersectoral conflict is present on the Coral Coast. This is between land-based activities and coastal resources. Sedimentation and flooding caused by poorly managed and designed land-based activities such as agriculture and logging threatens the productivity of coastal ecosystems.

Severe upland erosion resulting from poor logging practices behind a major resort led to the siltation of the resort water supply and impacted on tourism activities such as hiking and freshwater swimming (ESCAP 1998). There is also currently conflict between tourism and coral harvesting activities in certain areas as a result of degradation of coral reefs caused by coral harvesting.

The resolution of such problems can only be possible through a coordinated effort of many departments including NLTB, Forestry, Fisheries, Environment, and Tourism.

Conflict within resource owning institutions
Conflict on the management of marine resources has resulted within one tikina as a result of some members choosing to exploit the reefs for economic gain and others wanting to stop the activity and use the resources in a sustainable way.

Lack of legislation
As already mentioned, many of the environmental and social problems that exist are partly due to the lack of appropriate and effective legislation and policy. Examples are the lack of legislation requiring an EIA for development projects and the lack of a national policy to control and monitor coral harvesting.

Interpretation of Marine Tenure System
Resort owners, particularly in the past, often laid claim to the marine environment fronting their land and would often not allow nearby villagers to cross the beach or use the lagoon. Recently, the local communities are now claiming that they have accessibility rights to lagoon and reef areas and that tourist operators should pay them to use these areas for recreation. This has led to conflict in some instances.

C. Promising Initiatives

The Coral Coast has many examples of promising initiatives by government agencies, NGOs, village communities, hotels, and other organisations.

i. Mangrove Replanting

The Coral Coast is leading the way in Fiji in mangrove replanting to improve fisheries and address coastal erosion. Villages involved include Namatakula, Vucilevu, Korotogo, Yadua and Tagaqe District School. The efforts are currently been led by a Japanese environmental group, the Organization for Industrial, Spiritual, and Cultural Advancement (OISCA) working together with a local group CYDA and carried out by village groups, schools or visiting Japanese volunteers. In the past the South Pacific Action Committee for Human Ecology & Environment (SPACHEE) and USP also carried out mangrove replanting in the area. Mangrove replanting is also being organised at other sites outside of the Coral Coast.

ii. Village Marine Resource Management

A number of marine resource management activities are being carried out or are pending including bans on coral harvesting, restrictions on fishing, monitoring of beche de mer fishing, and discussions on setting up a tabu area in Korolevu i Wai Tikina. Only Votua village originally had an Environmental Committee. However, Tikinas Komave, Korolevu i Wai, and Cuvu have established Environment Committees.

iii. Marine Awareness Workshops

In the past awareness workshops on coastal and marine issues have been conducted along the Coral Coast by USP (Namatakula and Navutulevu), Ministry of Tourism, Department of Environment, FAB, WWF (Lomawai Tikina west of Coral Coast) and FSP (Cuvu Tikina). Villages indicated that awareness programs on conservation of their coastal resources are greatly needed.

iv. The Coral Gardens Initiative: Cuvu Bay Restoration Project

The Foundation for the Peoples of the South Pacific is carrying out a community based conservation programme in Cuvu Tikina dealing with issues of conservation, management and restoration of coral reef resources . The initiative involves the local communities and the Shangri-La Fijian Resort in environmental awareness and marine resource management and introduces active coral planting methods for habitat enhancement as well as assistance in developing sustainable income generating incentives.

The Cuvu Tikina Council adopted the Coral Gardens Project in July of 1999 and appointed an environment committee to act on environmental issues within the tikina. A series of PLA (Participatory Learning & Action) workshops were conducted for the eight villages in the tikina. These workshops identified the major environmental concerns of the area and management action plans were formulated. Issues identified included overfishing, freshwater flooding of Cuvu Bay, high levels of nutrient runoff, hydrology problems caused by the present resort causeway crossing, and infestation of crown of thorns starfish. Action plans included the setting aside of four tabu areas for the tikina and the establishment of a marine park for the Fijian Hotel. A youth group has also undergone training in Awareness Community Theatre (ACT) to promote environmental education for communities, schools and resorts in the nearby vicinity. Another project focuses on improving waste disposal methods. Other sections of the plan recommend a

ban on destructive fishing methods, size limits for certain species, erosion control in farms and gardens, and reforestation of the hillsides (Billings, 2002)

v. Coastal Processes and Erosion at Tagaqe Village, Coral Coast, Fiji Islands

The South Pacific Applied Geoscience Commission (SOPAC) was requested by the Mineral Resources Department of Fiji to investigate the causes of the coastal erosion at Tagaqe and recommend the most appropriate management strategy to minimize the impact of coastal erosion. Methods used included review of baseline data, past activities in the area, bathymetric surveys, current measurements, and the analysis of aerial photographs.

The village is located 20km east of Sigatoka and is eroding at an increasing rate. Three areas of concern were identified by the analysis of aerial photos:

1. The Tagaqe village beach has eroded 30-40m since 1951.
2. The Tagaqe river mouth has changed course over the years.
3. The adjacent area west of Tagaqe village has eroded approximately 10m since 1951, and may be a threat to the Queens Highway in the future.

A number of causes of coastal erosion were identified including:

- Natural causes such as a naturally high mobility of the shoreline at some locations, cyclones and storms, variations in wind and wave conditions causing cycles of erosion and/or accretion, changes in sea level, and changes in the natural supply of sand to the coast
- Human-related causes such as building too close to the shore, construction of vertical seawalls , removal of beach sand, dredging of lagoon sediments and coral reefs including reef blasting, disruption of natural sand movement by groynes, removal of mangroves, and changing river channel direction

Recommendations to reduce erosion and mitigate problems in Tagaqe village included:

- Non-structural solutions are the preferred approach for dynamic coastal sites such as this
- Nourish and stabilize the shoreline with vegetation such as mangroves
- Village physical development, infrastructure and tourism siting strategy should adopt building at least 30m back from the high tide water mark
- Partial or full seawalls to protect existing structures, such as the village beachfront and the burial site are measures of last resort, and are not a preferred long term solution
- Placing of sediment settling mats to slow down water movement and settling out sediment in priority locations

(Pitman *et al.* 2001)

vi. Tourism Workshops

As part of Resolution 3 of the Environment Sub-committee of the Tourism Forum, a Tourism and Environment Awareness Campaign was launched as a first step in developing environmental awareness and education for the tourism industry. The first phase involved village and school workshops and consultation with local backpacker operators. The workshops were carried out in 40 villages, 29 schools and 19 backpacker facilities, and involved discussions regarding the benefits of tourism and the need to conserve the natural environment and promote sustainable development. The workshops were conducted in tourism 'hot spots" along the Coral Coast,

Vatulele, Malolo and Yasawa Group of islands from June to November 2001. The workshops were conducted in the Fijian language and later in English at schools by a team of personnel from Fiji Visitors Bureau, Environment Consultants, Police, Roko Tui Saravanua and Department of Health.

Specific objectives were:
1. Discuss the economic, social, cultural and environmental benefits of tourism
2. Highlight economic, social, cultural and environmental problems affecting tourism
3. Discuss the role of the communities and schools in maintaining the environment for a viable tourist industry in Fiji

Issues highlighted in the workshop that affect tourism included crimes committed on tourists, land and fisheries disputes amongst landowners or between landowners and the tourist operators, rights of access to land leased by tourist operators, and rights to determine activities of tourist operators within their customary fishing grounds.

The importance of coastal habitats, such as coral reefs, sea grass beds, mangroves, and coastal forests, were also highlighted in the workshops as were environmental issues such as destruction of coral reefs through coral extraction, use of destructive fishing methods, destruction of mangroves, deforestation, excessive fertiliser use on land, use of pesticides and other chemicals, and sewage pollution.

The second phase started in December 2001 and involved the use of TV and radio to broadcast tourism and environment information.

vii. Environmental Impact Assessment – Natadola Marine Resort

Natadola Beach is of international quality and has been recognized as having potential for development as a major tourist resort. Sanasana village lies adjacent to Natadola Beach. These villagers are important landowners and rely heavily upon the marine resources for subsistence, cash crops and the selling of shells to tourists. Off Sanasana village is Navo Island, a limestone island of national archaeological and cultural significance. It is proposed for the Natadola Marine Resort to be located on 300 ha of state and native lease land adjacent to the village and the beach. Current plans include 4 hotels, condominiums, an international standard golf course and a marina.

An EIA was thus commissioned by the Fiji Government to review the competing demands for Natadola, their environmental impacts and make recommendations that will protect the environment, interests of local residents, current users of the beach and the economic well being of Fiji. Environmental Consultants Fiji was appointed to carry out the EIA.

Significant issues identified included the impact on Sanasana village community, public access, provision of worker accommodation, and the fate of Natadola Beach Resort and tourist train.

Potential negative effects of the development include:

- Changes to Sanasana village and villager's lifestyle such as loss of privacy, loss of access to traditional land for growing crops and reduction of productivity of *i qoliqoli.*
- Modifications of marine environment and coastal processes such as increase in suspended sediment from construction works and physical damage to reefs from reef walking and anchors.
- Adverse effects resulting from the demand for workers housing
- Loss of public access
- Damage to archaeological sites

Positive impacts include:
- A major contribution to Fijian economy
- Significant social and economic opportunities for Sanasana villagers
- Protection of beach vegetation and improvement in water quality
- Provision of public facilities at beach

Key recommendations put forward to ensure that the resort has minimum impact on existing physical and social environment include:
- Marina does not proceed until further investigations are completed to ensure no adverse effects on marine environment will result
- A buffer between the beach berm and resort facilities is established
- No continuous solid structures are built in any foreshore location
- A bond be required from the developer to cover government's potential environmental and financial liability
- The developer prepares an environmental management plan that includes monitoring
- The developer assists the people of Sanasana village prepare for the development
- Government be proactive in planning for workers accommodation

It should be noted though that the most important aspect of an EIA is not just the process and carrying out an EIA but what results from the EIA. For example recommendations of an EIA are only useful if for example the Town and Country Planning or other agency includes these in development approval conditions and enforces these during the construction and operations phases of the development (Environmental Consultants Fiji. 1999).

viii. Sustainable Land Management – Bemana,

The Land Use section of the Department of Land Resources Planning and Development have conducted Participatory Rural Appraisal (PRA) workshops in Bemana Tikina, Nadroga to identify the problems faced by the communities, identify resources available and understand the sociocultural and economic needs of the people. It also included a physical appraisal of the resources available. The main aim, however, was to developing a PRA- derived land use plan for the area. Recommendations were also made on the sustainable development of resources such as land, forests and the tore (lake) so as to improve the standard of living in this rural area.

It was found that agriculture was the main source of income for the villages in the tikina. Problems in the tikina include:

- lack of infrastructure such as roading and access
- lack of agricultural implements and high costs of inputs
- lack of arable land
- river bank erosion
- lack of entrepreneurship
- no fixed market
- increase in social problems due to population increase

The land use plan identified the resources available and their potential such as replanting of kuta, fish and prawn farming, watermelon farming, pine plantations, logging of indigenous forest, cattle raising, and small scale tourism (Department of Land Resources Planning and Development 2001).

ix. Sigatoka Sand Dunes National Park (SSDNP)

In 1988, the Government of Fiji decreed the Sigatoka Sand Dunes as Fiji's first National Park. It is an area of outstanding landscape, biological interest, and one of the most important archaeological sites in the Pacific. It is the burial ground of more than 100 people dating back nearly 2000 years ago. The National Trust of Fiji currently manages the park.

The Sigatoka Sand Dunes are located directly west of the mouth of the Sigatoka River. The dunes cover an area measuring approximately five kilometers by up to one kilometer forming a teardrop-shaped expanse of sand. At their highest point the dunes rise to an elevation of 50 meters above sea level. They are known both locally and internationally for their unique natural vegetation, dramatic landforms, and extensive archaeological sites.

It is suggested that dune formation begun around 4-5,000 years ago. Extensive archaeological deposits are present including charcoal, carbonised tree remains, pottery, and human bones. Threats to the dunes include wind erosion, sea erosion, sand mining, and human disturbance such as recreation and educational visits. The dunes are located on freehold land and a large block of State land.

In 1997, the National Trust opened a Visitor Centre and an associated network of marked trails managed by two rangers at the western end of the dunes. This has proved an effective measure for controlling public access within the National Park. However, there are no similar controls in place at the eastern end of the dunes which are easily accessible from Club Masa and Kulukulu village. An obstacle to effective management is that the dunes fall on both private and publicly owned land. Recommendations have been made to initiate an ongoing monitoring program to monitor erosion of the dunes and develop a management plan to alleviate the human-induced impact on the dunes as well as make it a more marketable destination for visitors such as improvement of tracks, provision of interpretations along track (Wood, et al. 1998).

The SSDNP offers visitors a naturally and historically significant experience with spectacular views and an enjoyable walk. Tourists, locals, and school excursions often visit the dunes. Other activities include horseriding, swimming, and training.

G. Lessons Learned/Future Ideas

Many of the lessons learned nationally also apply to the Coral Coast. An emerging realization in the tourism industry is the importance of maintaining a healthy environment to sustain the tourism operation and willingness to work with and support communities and NGOs in doing so.

The Shangri-La Fijian and Outrigger Reef resort stand out in their effort. Among other projects both are looking at novel methods to lessen waste entering the marine environment. Taking the lead in appropriate technology transfer is a key role that can well be played by industry. These innovations are timely as there is widespread feeling that along the Coral Coast shores are eroding, fish are disappearing and coral reefs are in poor shape. These declines may be a reason so many communities are seeking help for coastal rejuvenation.

It is perhaps a critical time to gather data and explain reasons for these changes. The Coral Coast has undergone extensive development in the last 30-35 years. It is past time to determine if the carrying capacity of its ecosystems have been overwhelmed and what steps are needed to avoid experiences such as Jamaica in which tourism development has often led to reef destruction and then tourism decline.

IV. TOWARDS AN INTEGRATED COASTAL MANAGEMENT APPROACH

As illustrated through this Background Paper, the current approach to managing Fiji's precious coastal and marine resources is a combination of sectoral government policies and local level initiatives. These initiatives are important and in some cases achieving significant, positive results but they are clearly not sufficient. In too many places coastal people are getting poorer, not benefiting from development, and resources continue to degrade and decline at an alarming rate.

The causes for this are several.

Mechanisms to sustain and expand already proven approaches to conservation and sustainable marine and coastal use are insufficient: As demonstrated in the background paper, there are multiple small scale coastal management "success" stories in Fiji. With the notable exception of a Department of Fisheries' commitment to work with villages to create 200 LMMAs, sustained programs to build upon and extend the lessons from successful initiatives are lacking.

Tangible demonstrations as to how integrated coastal management approaches can positively contribute to the conservation and sustainable use of Fiji's resources at significant scales are limited. While there are small scale success stories, there are as yet no demonstrations of how the ICM approach can contribute at a significant scale. Hence it is difficult to realistically assess "what it will take" and "what benefits can be realized" in Fiji through the use of such an approach in geographic areas of concern.

Capacity and experience in integrated coastal planning and management is limited in Fiji. Despite interest in integrated approaches, capacity is lacking both within government and other key sectors of Fijian society on the methods for ICM.

> **ICM** is a continuous and dynamic process that unites government and the community, sciences and management, and sectoral and public interest in preparing and implementing an integrated management plan for the protection and development of coastal ecosystems and resources

A policy framework for advancing coastal management at either the national, district or even local level is lacking. While a number of more integrated policy initiatives are under consideration, mechanisms are lacking whereby **feedback to and coordination among** agencies can occur. This situation is perhaps most evident and challenging where government and traditional institutions attempt to work together on marine and coastal issues.

It is neither possible nor desirable to address these issues all at once. Rather, it is the challenge of this workshop to begin to define realistic next steps that can propel the nation forward towards meeting the goal of integrated coastal management….to improve the quality of life of human communities which depend on coastal resources while maintaining the biological diversity and productivity of coastal ecosystems.

Appendix A. Summary of ministries involved in coastal management and their roles

Ministry	Agency	Role
Ministry of Agriculture, Sugar and ALTA	Agriculture Department	Responsible for the expansion of commercial agriculture. Promote appropriate forms of agriculture. Land resources planning.
Ministry of Fisheries and Forests	Fisheries Department	Responsible for the development of fisheries within the EEZ and territorial waters and controlling fisheries utilisation and long-term sustainability through management of fishing areas, policing sale of undersized marine produce and prosecuting users of destructive fishing practices
	Forestry Department	To develop the forest sector while using environmentally sound and sustainable practices. Mainly concerned with logging operations and establishment of plantations.
Ministry of Lands, Mineral Resources and Energy	Department of Lands and Survey	Administers all State-owned land and water below the high-water mark. Approve projects involving reclamation and dredging of foreshore and foreshore leases
	Department of Mineral Resources	Regulates exploitation and extraction of mineral resources
Ministry of Housing, Urban Development and the Environment	Department of Town and Country Planning	Accountable for the planning of multiple land use and development
	Department of Environment	Provides advice to other government departments on environment-related issues. Develop environmental policy. Coordinating Environmental Impact Assessments. Develop environmental education and awareness programmes. Maintain an environmental information database.
Ministry of Public Works, Infrastructure and Transport	Public Works Department	Provides advice and service to government departments for works on buildings and engineering construction. Also responsible for the provision of safe and potable water for major population centres. Responsible for the provision of adequate sewerage treatment facilities for all major urban centers. Ensuring the appropriate disposal of household and industrial waste
	Marine Department	Issuing of certificates of seaworthiness. Implementation of a number of international conventions dealing with the marine environment
	Ports Authority of Fiji	Provision and maintenance of adequate and efficient port services. Responsible for pollution in ports.
	Native Lands Trust Board	To manage the leasing of native land on behalf of the landowners to ensure sustainability
Ministry of Fijian Affairs	Fijian Affairs Board	To formulate, implement, coordinate and monitor policies and programmes aimed at promoting the welfare and good government of indigenous Fijians
Ministry of Tourism	Department of Tourism	Responsible for promoting and regulating the development of the tourism industry
Ministry of National Planning	Central Planning Office	Responsible for preparing the strategic development plans for Fiji and policy papers, preparation of budget proposals for different ministries etc.
Ministry of Health		Responsible for the Public Health Act which covers a multitude of environmental problems that have harmful effect on health e.g polluted harbours, air pollution, drinking water quality. Responsible for disease vector control.

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