

Case Study D

PROMOTING A HEALTHY ENVIRONMENT: A CASE STUDY OF THE WAI BULABULA AND CORAL GARDENS INITIATIVE, CUVU DISTRICT, NADROGA, FIJI

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ABSTRACT

The well being of indigenous coastal communities is directly dependent upon the health of coral reef ecosystems. Coral reefs are vital providers of protein rich foods for island communities and provide needed income for fisheries and tourism resources. Unfortunately with the increasing development pressures and related negative human impacts, coral reefs are rapidly declining.

Recent initiatives by the Department of Fisheries, non-governmental organizations, coastal communities and other stakeholders have focused on restoring coral reefs ecosystems. However, there are fewer integrated efforts towards controlling and or managing land based sources of waste entering the marine environment. Most industries located along coastal areas dispose liquid wastes directly into rivers or the sea without adequately treating it to a higher quality.

With this in mind the Foundation for the Peoples of the South Pacific (FSP Fiji) initiated 2 community based pilot projects in the Cuvu District, Nadroga, August 1999. Cuvu is situated along southwestern Viti Levu, the largest of islands in Fiji. The Wai Bulabula aimed at offering communities and a resort with innovative approaches to managing and or treating land based sources of pollutants. It was funded by the Darwin Initiative for Survival of Species and Network Foundation from 1999 to 2001. The Coral Gardens Initiative provided communities with ways of restoring degraded coral reefs and simple methods of replanting coral. The latter project is being funded over a 5 year period from 1999 to 2004. Initially conducted on a smaller scale as pilot projects in collaboration with a five star resort the Shangri La's Fijian Resort. It was intended to be developed as workable models for community based conservation in Fiji and the Pacific.

The Cuvu projects are conducted in partnership with relevant stakeholders including numerous government departments (Fisheries, Agriculture, Health, Environment, Provincial Authorities) resource owners, the Shangri La's Fijian Resort and non-governmental organization like FSP Fiji. A district environmental committee was appointed by the local district council to over see project activities. A community based management plan was developed by communities through a series of Participatory Learning and Action (PLA) Workshops and endorsed by the District Council with the blessings of their high Chief, Na Turaga Na Ka Levu, and Ratu Sakuisa Makutu. This plan included the demarcation of 3 marine protected areas (MPA), training of 14 fish wardens, replanting of mangrove seedlings and coral, establishment of a soil conservation site, restocking of MPA sites with clams, waste management workshops, community based monitoring and Women in Fisheries workshops.

The Foundation for the Peoples of the South Pacific (FSP Fiji) is a non-governmental organization that was registered in 1978 under the charitable trust act. In Fiji FSP is also commonly known as the Kana Project. Its basic aim is to empower local communities make informed decisions about their developments, with particular emphasis on rural communities. FSP Fiji has over 20 years of community projects ranging in the fields of education, health, nutrition, disaster awareness, sustainable forestry, conflict management and agriculture. FSP Fiji is commonly known throughout Fiji as the Kana project, one of its initial projects. FSP Fiji is a founding member of FSP international having affiliates in Vanuatu, Solomon Islands, Papua New Guinea, Tonga, USA, UK and Australia.

WAI BULABULA PROJECT

The Darwin Initiative for Survival of Species funded the Coral Reef Conservation Wai Bulabula project. Commencing in August 1999, the pilot project was funded for two years, with FSP intending to extend and expand the project through further grants. The Wai Bulabula was implemented by FSP Fiji, in collaboration with Just World, UK. This project aimed to conserve coral reefs and their associated biodiversity by managing land based sources of pollution, particularly wastes containing nutrient loadings, through participatory community approaches.

In response to the wastewater issue the FSP Fiji office appointed it's partner in the UK, Just World Partners (JWP), to identify a technical group that could do a pilot project in Fiji and if proven successful it could be replicated in other parts of the country. The 2 major components of the Wai Bulabula projects were:

- (a) Address the problem of high nutrient loadings from the Fijian Resort that was impacting the marine ecosystems negatively
- (b) Build the capacity of Cuvu district to manage the quality of waste waters entering the marine environment through awareness raising and training workshops.

The project provided communities and a resort with simple technologies for treating wastes naturally before they get into the marine or stream environment, while at the same time providing useful products. Living Waters ecological treatment systems include native wetland plant species and trees that absorb and use waste, resulting in a cleaner environment and increased local resources. Community based environmental awareness, resource management, and training are important aspects of the program.

THE CORAL GARDENS INITIATIVE

The Coral Gardens Initiative began as a small pilot project in January 1999, with funding from the Pacific Development and Conservation Trust, and matched by the Fijian Shangri-La Resort. The project was expanded to a full project in June 2000, on receipt of three years of grant funds from NZODA, with subsequent funding by the Mac Arthur Foundation and Packard Foundation.

The goal of the Coral Gardens Program is to develop and implement a comprehensive and workable community-based model for marine resource management and recovery. The program was designed to empower resource-owning communities to take full responsibility for the wise utilization of their marine resources, and in accordance with existing traditional and governmental structures. Coral Gardens seeks to work with governments, like-minded non-governmental organizations, and the tourism sector towards this common goal of community-based marine resource conservation and environmental restoration in Fiji and the Pacific.

Despite being separate in terms of funding the Coral Gardens and Wai Bulabula project shared similar fundamental objectives i.e. the conservation and management of coral reefs through participatory approaches. Therefore they were both implemented at the same site. Cuvu district was specifically chosen for the implementation of these projects as a result of the enthusiasm of local communities, the extent of local marine pollution, and the presence of financial and logistical support from the Shangri La's Fijian Resort.

It was then decided to implement both projects in the same area for mutual benefits to both Cuvu district and the 2 projects. The resort was also an ideal option because it is located on Yanuca Island about 100m off the mainland. Wastewater from the resort is likely to enter Rukurukulevu channel and Cuvu bay, located within the traditional fishing grounds of Cuvu. It offered an ideal opportunity to monitor nutrient loadings in the wetlands and waters surrounding the island.

The Coral Gardens and Living Waters worked together to empower local communities to reverse the decline of coral reefs and near shore waters, to increase local benefits such as food and income, and reef-based tourism.

CUVU DISTRICT

Cuvu district is situated south west of Viti Levu, the largest island in the Fiji group. Cuvu is a coastal district comprising of 7 villages namely Yadua, Navuevu, Tore, Sila, Cuvu, Rukurukulevu and Hanahana. Another village, Voua, belongs to another district but is Rukurukulevu and Hanahana. Another village, Voua, belongs to another district but is located within the boundaries of Cuvu district was also consulted. Cuvu village is the official residence of the Cuvu district and Nadroga Provincial high chief, Na Turaga Na Levu, Ratu Sakuisa Makutu.

COMMUNITY PROCESS

The community process began with initial consultations and discussions with the Provincial Office, chiefs, community leaders and the Shangri La's Fijian Resort. FSP then deliberately avoided contact with the communities at least 3 weeks. During this period communities discussed and confirmed amongst themselves their interest in the projects. Whilst this took place, FSP Fiji informally contacted relevant government departments in the Sigatoka province (e.g. Fisheries, provincial office, agriculture). The aim was to gather background information of Cuvu district. Through their representatives, the communities contacted and invited FSP to a district council meeting. The district council meets on an average about 4 times annually. However, special meetings are held when the need arises.

Whilst communities had agreed and eagerly accepted the proposed projects, it was finally endorsed at the district council meeting. The Coral Gardens Initiative and Wai Bulabula project the had the blessing of both

the (former) high chief, Na Marama Na Ka Levu, Adi Bulou Eta, and the vanua. It was decided by the heads of the 7 communities that an environmental committee was appointed to oversee the project and be the liaison group between FSP Fiji and the community. The district heads did this selection. As the project covered the whole district of Cuvu, it was able to tap the existing Fijian administration through the district council (refer to appendix 1). A secretary, Nepote Senikau, and chairman, Ilieasa Ratuva were also appointed. Equally important was their role to keep the district council and high chief informed of project progress.

CUVU DISTRICT

Cuvu district environmental committee is owned and managed principally by landowners but also includes government ministries such as the Department of Fisheries, Lands, Agriculture, Environment, Forestry, Local Rural Authority, Nadroga Provincial office, the Shangri La's Fijian Resort and non-governmental organizations including FSP Fiji and OISCA (a Japanese NGO focusing on replanting of mangroves and reforestation of degraded watersheds). In the best interests of the communities it was unanimously agreed that both the Wai Bulabula and Coral Gardens Initiative was centrally through the Cuvu district environmental committee.

Whilst it was obvious to some extent that wastewater management and marine degradation were principal concerns for these communities the projects did not pre-empt the communities but preferred to learn from the sources themselves. This was achieved by using the Participatory Learning and Action (PLA) methodology. The process was written by the project community consultant, Dr Hugh Govan from the U.K with inputs from local practitioners of the PLA process.

COMMUNITY TRAINING WORKSHOPS

Seven Participatory Learning and Action (PLA) workshops for all were conducted for all villages. With assistance of 3 experienced facilitators (from the SPACHEE, Social Welfare Department Sigatoka and Fijian Affairs Board) FSP Fiji in conducted these PLA workshops. The PLA workshops consisted of various exercises or tools that sought to gather information. The purpose of these workshops was for communities to discuss environmental problems or concerns, identify the causes of these problems, recommend solutions. Nearby villages such as Navuevu, Tore and Sila had combined workshops. A total of 250 persons attended the PLA workshops in all villages.

Traditionally conservation or development projects have followed a top down approach. When reviewed after several years many were found to be abandoned or incomplete. The underlying reasons for this is an essential lack of lack of participation by the community from onset of the project.

An objective of the projects was to ensure active community involvement from the onset of project and promotion of local ownership. To encourage greater and wider participation, participants discussed exercises in peer groups (e.g. men, women, youths etc.). At the end of every exercise, groups reported to others the outcome of their discussions. This approach generated enthusiasm and helped participants to:

- Identify future stakeholders
- Realize that the purpose of the project was to empower them to better manage their resources i.e. ownership of project belonged to the communities.

Community training also consisted of Environmental Awareness Raising and Community Based Monitoring.

FINDINGS OF THE PLA WORKSHOP

The PLA report found that:

- (a) The majority of pollutants entering the marine environment are land based
- (b) The vast reduction in shellfish and fish in the last 40 years is most probably a result of over exploitation, destructive fishing methods and pollution
- (c) Major concerns of most villagers was decrease in marine biodiversity, within the communities traditional fishing grounds
- (d) Deforestation and accelerated soil erosion

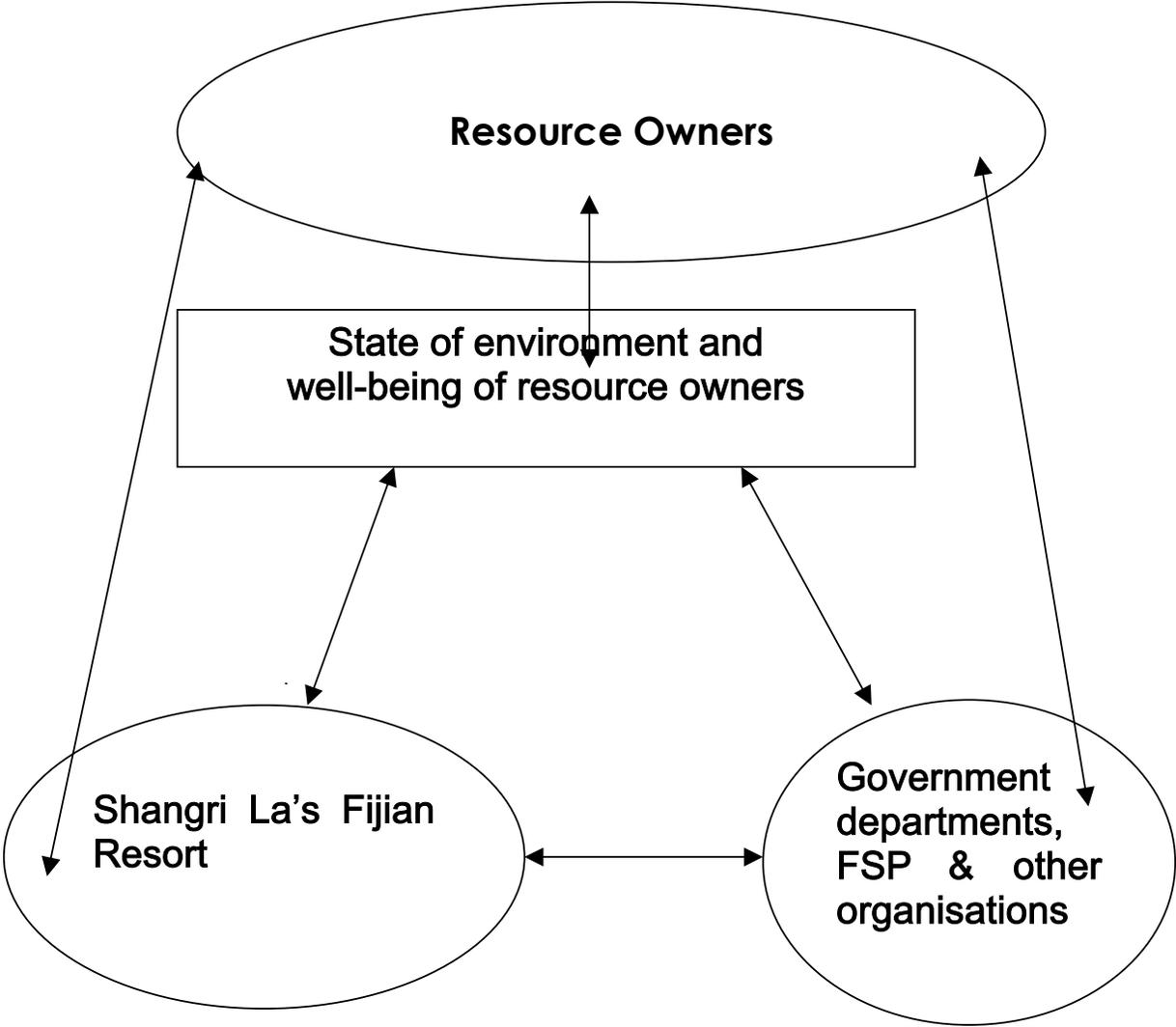
- (e) A concern was the occasional release of wastewaters from the Shangri La's Fijian Resort into Rukurukulevu channel. Villagers claimed that it was responsible for the physical and biological degradation (i.e. decrease in fish and shellfish) in the channel.
- (f) Deforestation of mangroves

COMMUNITY RESOURCE MANAGEMENT WORKSHOPS

FSP compiled PLA reports in English and also translated them into Fijian. At an environmental committee meeting, summarized findings of the workshop were presented. The committee then organized dates for community resource management workshops at village level. Four Community Resource Management workshops were conducted for the whole district, each lasting two days. These workshops were solely coordinated and facilitated by FSP Fiji as the staff capacity had increased from the PLA workshops. Venues for these workshops included Yadua, Navuevu (for Navuevu, Tore, Sila), Cuvu and Rukurukulevu (combined with Voua and Hanahana). A total of 308 participants attended. The PLA approach was also designed to incorporate traditional environmental knowledge into community management plans.

The purpose of the 2nd round of workshops was for communities to ponder over the PLA workshops (i.e. reflect and confirm the findings of the report) before deciding on what particular training or technical skills they required. A feature of these workshops was the presence of government ministries including the Local and Rural Authority, Land Use Section, Health department, Fisheries, Native Land and Fisheries Commission, Agriculture and the OISCA. Their participation served two purposes (a) bringing them up to date with the Coral Gardens and Wai Bulabula project (b) an opportunity to explain to communities training and skills that they could offer to villagers in order to empower them conserve and manage their resources. Communities also had the chance to ask project related questions to the relevant government departments in their villages as compared to visiting their offices separately. The participation of these stakeholders was mutually beneficial. Secondly, it illustrated that community development was possible through the joint efforts of the district, government departments, private sector (i.e. Fijian Resort) and Non-governmental organizations. All communities were grateful as this the first time for most including the elderly to see several government department representatives all at their villages. An outcome was the request for specific training including environmental awareness raising workshops.

Stakeholders in the Development of Cuvu Project





A women's group discussing an exercise during a community workshop

The community resource management workshops were a success because communities got to better understand the concept of empowerment and recommended specific training workshops. It also established strong ties between the major stakeholders: FSP, communities, government departments and the Shangri La's Fijian Resort. Government ministries strongly reaffirmed their support towards the district projects and this was viewed as a big boost for their villagers. For most communities it was the first time that they were able to collectively raise the environmental concerns with government departments. For example, Rukurukulevu villagers were concerned about the biological and physical degradation of their channel. All communities unanimously agreed on the establishment of marine protected areas (MPA) and began discussions about the selection fish wardens. Other requests include training of fish wardens, Women in Fisheries workshops, replanting of mangrove seedlings, soil conservation and waste management.

The awareness raising workshops had positive impacts on the communities. For example, it was found that there was a significant reduction in the amount of solid wastes that was previously dumped into Rukurukulevu channel and Cuvu beach, which was used by some as a rubbish dump, was recently cleaned and is now well kept. Villagers now realize the linkage between the conservation of the marine environment and controlling of land based sources of pollution. The community resource management workshops generated much enthusiasm amongst communities. Some activities that the community proceeded with include the replanting of mangrove seedlings, the planting of coconut hybrids to stabilize the foreshore, the establishment of a soil conservation site, the demarcation of three marine protected areas and the demarcation of a mangrove protected area.

ESTABLISHMENT OF MARINE PROTECTED AREAS

During the PLA workshops carried out as part of the project all communities unanimously requested the establishment of marine protected areas (MPA). The declaration of 3 marine protected areas took place on the 4th July 2001 at a district council meeting, after months of consultations, workshops and collaboration by FSP, Cuvu district environmental committee, communities and the district council. However the 3 MPA sites were demarcated earlier on the 14th June 2001. One of the tabu sites is located directly in front of the Shangri La's Fijian Resort is proposed to be upgraded as the Yanuca Marine Park. FSP Fiji, the Fijian resort and the Cuvu community are discussing developing a trust fund for coral reef conservation, based on tourist fees into the Yanuca Marine Park. It should also be noted that other communities in Fiji are simultaneously implementing their own MPA sites. Facilitated by the Department of Fisheries, a one-day introductory fish warden's workshop was conducted at Cuvu village, for all 14 traditionally appointed fish wardens. These wardens were given the responsibility of policing their MPA sites.

Each village has its own wardens who are issued with identification cards that are authorized by the Department of Fisheries. Nearby villages such as Navuevu, Tore and Sila share a common MPA site. The main beneficiaries of the project have been the communities themselves. Many villagers have observed more fish species swimming closer to shore or by the marine protected areas. This has generated much

enthusiasm in the project. Several villages from nearby districts have also implemented their own protected areas including marine and mangrove areas. Initially established for a year, the Cuvu district has decided to extend the MPA sites to three years. The Cuvu experience draws similarity to a World Bank report on a comparative study of coastal resource management in the Pacific islands which found that the presence of marine protected areas in a community seems to act as a catalyst for increasing interest, knowledge and awareness of coastal resource management (1999:45).



Map 1. A coastal map of Cuvu district. The blue areas represent marine protected areas whilst red areas are communities.

MONITORING OF MPA SITES

As part of the ongoing training, monitoring workshops were conducted for Yadua and Navuevu in April 2002. The purpose of these workshops was to establish a community based monitoring system that could be used by locals to continue monitoring the progress of their reefs. Twenty youths were trained in monitoring at Yadua and Navuevu. These monitoring workshops will be extended to other villages in the district. Communities can then decide whether they conduct the monitoring on a yearly or biannual basis.

RESTOCKING OF CLAMS

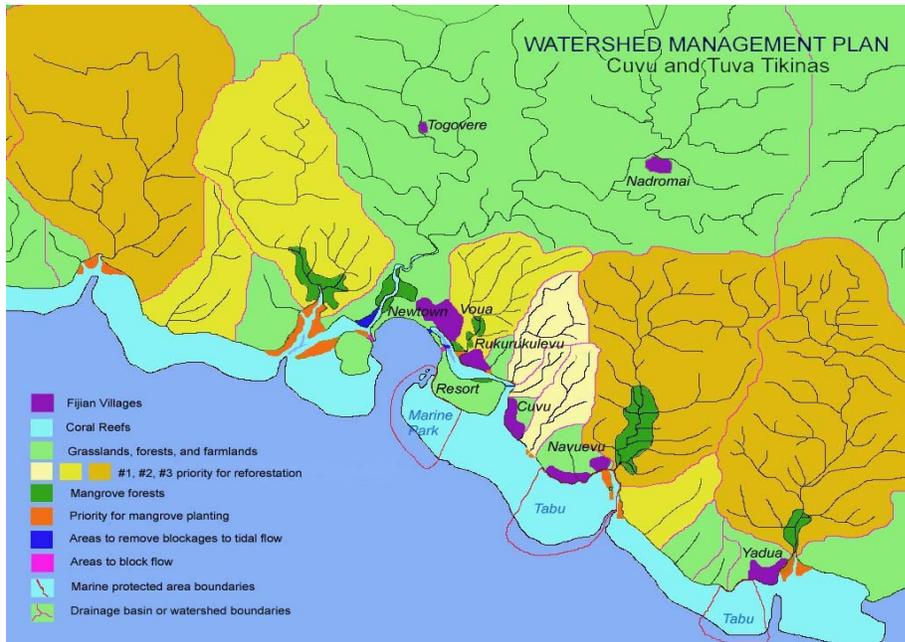
FSP Fiji recently signed a memorandum of understanding with the Department of Fisheries in August 2001. The Coral Gardens project will use the Makogai Research Island to secure giant clams and trochus (from Makogai Hatcheries) for reef enhancement in the Coral Gardens sites. Through this agreement FSP brought over 700 clam seedlings in June 2002, from Makogai Island, department of Fisheries Research Station, to Cuvu. The clams were put inside the MPA at Yadua, left there for a week to acclimatise before being distributed evenly amongst all MPA sites.

WATERSHED MANAGEMENT

Based upon a preliminary environmental assessment of waste and water management at the Fijian Resort and adjacent watersheds it was found that the main watershed impacts on reefs appear to be related to occasional massive fresh water and silt influxes during heavy rain and cyclones. This is made worse by the steep hills and erodable soils. All together there are about 7 main watersheds. Three watersheds have been

identified as priority because they lack mangroves; deposit sediments directly onto the reef flats and owing to their sizes are manageable. Two are located just above and below the course way while the third is situated between Cuvu and Tore (see Map 2 below).

A difficulty experienced with watershed management was the uncertainty of renewal of lease agreements. The majority of occupants in the reaches of the watersheds are cane farmers leasing land from local communities. With the uncertainty of renewal of lease agreements most farmers lacked interest in improving land management practices. As a result of this, a soil conservation site was established. In conjunction with the Department of Agriculture and landowners, Vertiver grass (*Veriveria zizanooides*) was planted in contours along a steep slope in an area of about 3 acres at Yadua. Vertiver forms a dense root network and thick hedges thereby reducing soil erosion and allowing more water to filter through the soil. Commercial crops such as pineapple and sugarcane are planted in between the hedges. This is intended to serve as a demonstration site for other farmers and villagers in the watershed area.



Map 2. Watershed Management Plan of Cuvu (not drawn to scale).

PROJECT OPERATION AND PARTNERSHIPS

The Cuvu project was successful in seeking the consensus of relevant stakeholders. These included the district council, district environmental committee, present high chief Turaga na ka Levu Ratu Sakuisa Makutu, government departments such as the Fisheries and Agriculture Departments, the native land and fisheries commission, the provincial office, mineral resources, health and environment. A non-governmental organisation, OISCA, and the Shangri La's Fijian Resort also participated. The Cuvu District Environmental Committee coordinated project activities in conjunction with the above stakeholders. All these stakeholders participated in community workshops, training workshops and other field activities. Two villagers from Verata village also made presentations in these workshops describing to the people of Cuvu their experiences of the Verata community based projects.

LOCALLY MANAGED MARINE PROTECTED AREA WORKING GROUP

FSP joined a further networking group, which includes the University of the South Pacific, and other non-governmental organizations that are implementing conservation projects. The Wai Bulabula project had strong connections with the Department of Environment keeping them regularly updated of progress throughout the project life.

This partnership with the high chief *Turaga na Ka Levu*, Ratu Sakiusa Makutu, the Cuvu Tikina Environment Committee, Shangri-La's Fijian Resort, and various Fiji Government Departments such as Environment, Fisheries, and Tourism will serve to assist the Cuvu community to restore, protect, and manage their marine resources. It is FSP's aim that this site will continue to develop and the reef will be restored, and that it will become a model of collaboration and partnership between all of the various stakeholders.

CUVU THEATER GROUP

A Cuvu drama group was formed (under the Act project) with the aim of training youths to promote environmental awareness throughout the district. This group was also approved through the district council and environmental committee. On the 14th – 16th May 2001 a workshop aimed at raising environmental awareness of youths especially was conducted at Tore village. FSP, the department of Environment and the Wan Small bag theatre group jointly facilitated this workshop. The Cuvu theatre group has also performed at numerous workshops through out the country.

STABILIZATION OF COASTLINE

The Shangri La's Fijian Resort financed the transportation of 2000 hybrid coconut seedlings from Tavueni (Agriculture Research Station) to Cove. These seedlings were evenly distributed amongst all villages and planted to stabilize their coastline. The hybrid plants grow faster and bear fruits between 2 – 3 years as compared to normal plants that mature at 5 years.

MANGROVE REPLANTING

The OISCA, a Japanese non-governmental organization, based in Sigatoka assisted Yadua village replant mangrove seedlings along their foreshore especially along deforested areas. These seedlings are mainly *Rhizophora. Spp*. To dates over 400 seedlings have been planted, some reaching over a metre in height. A nursery was also initially set up to supply seedlings for other villages. However these seedlings are insufficient, and with the OISCA being committed to replanting in other parts of Fiji. In July 2002 it was decided that FSP work directly with the other villages to search for seedlings and set another nursery. A nursery is currently being established at Navuevu village. Apart from a marine protected area Navuevu also declared their present mangroves a reserve.

WASTE MANAGEMENT WORKSHOPS

A series of waste management workshops is being conducted in Cuvu district throughout the month of July 2002. The purpose of these workshops is raise awareness on the importance of managing wastes and discussing potential options that communities can adopt to promote a healthy environment. Other topics such as watershed management is integrated into the workshop content to stress the importance of managing land based sources of pollution in order to conserve the marine environment. Resource Personnel for the workshop included FSP, the Sigatoka Local Rural and the Land Use Section.

Organizational Roles of Stakeholders in FSP-Fiji's Cuvu Environmental Projects

ORGANISATION	ROLE
The Nadroga Provincial Office	Fijian administration and activities (a body of the Fijian Affairs Board) of the province.
Cuvu Tikina Environmental Committee	Coral Gardens and Wai Bulabula projects (appointed by the Cuvu Tikina Council) work with the district through this body.
The Native Lands and Fisheries Commission (records the affairs of the "I Taukei")	Custodian of indigenous Fijian land boundaries, including fishing rights, documentation, and registration.
The Department of Fisheries	Government stakeholder that is able to offer technical assistance (e.g. fish warden training) and advice to communities.
The Land Use Section (Department of Agriculture)	Assistance in soil conservation and watershed management.
The Department of Lands and Survey	Issues licence/lease and stipulates conditions for foreshore developments. Works in conjunction with the department of Environment and other stakeholders. Informs and advises the environmental committee on legal procedures.
The Department of Mineral Resources	Assess and determine the geological implications of foreshore developments. Works in conjunction with the department of Environment and other stakeholders. Advises the environmental committee on legal procedures. Assist with analysis of water samples from ponds.
The Sigatoka Local and Rural Authority	Rubbish disposal and health /hygiene of Sigatoka rural areas with particular emphasis towards villages.
The Sigatoka Town Council	Works in conjunction with the Local and Rural Authority.
OISCA International	Japanese NGO offering assistance in community based reforestation, including mangroves and hillsides.
The Fijian Shangri-La's Resort	Located within the traditional fishing grounds the resort provides financial and logistical support towards the project. Assists with venue and transport for the committee meetings.
FSP-Fiji	The Facilitating NGO for community-based management and resource restoration.
The Village Communities	Management planning, enforcement, Tokatoka, Women's groups, etc... monitoring, etc. These groups play an active role for project success.

ARTIFICIAL WETLANDS TREATMENT SYSTEM

The Wai Bulabula project team together with a local contractor (Kanta Construction, Sigatoka) successfully took on the challenge of completing the wetlands treatment systems. Apart from the delays caused by the initial consultants not being able to provide on sight supervision of the wetlands, construction process was prolonged as a digger with a rock breaker had to be used to lower the base of the last two wetlands which had an unusually rock hard limestone base. A total of 5 men from Cuvu district, the Wai Bulabula team (2) and 11 laborers from Kanta Construction worked on the wetlands.



Wetlands construction

Three wetlands were constructed in December 2001, each 60m x 8m in dimension. Constructed along a slope, they allow wastewaters to flow from one wetland to the other. A layer consisting of black polythene (200 microns thickness), chicken mesh wire and 5 inches of concrete seals the wetlands thereby preventing seepage. The average depth of the water column is 20cm. At the base of the wetlands is a 10cm layer of gravel used to anchor roots and keep plants upright. The wetlands are connected by an outlet or lip that ensures that while depth is maintained at 20cm excess water flows into the next wetland naturally.

In terms of design, construction and maintenance of appropriate ecological waste technologies the project was successful in constructing an artificial wetlands treatment system for the resort. However, given the circumstances experienced it was not possible to construct one at a community. This was because of the unsuccessful contracting of 2 technical assistants. FSP Fiji is presently seeking fund to take the project to community level.

The quality of water in the wetlands treatment system is monitored on a monthly basis. Dr Luke Mosley of the University of the South Pacific and the department of Mineral resources is assisting the project. Water samples were analyzed from the first and final lake. The most recent analysis as listed below indicates a 75% reduction in nitrates and 10% reduction in phosphates. The huge reduction in nitrates is a major break through as the purpose of these wetlands is to improve the quality of wastewaters by consuming nutrients (i.e. nitrates and phosphates). However the phosphates loading to the ponds is very high relative to nitrate levels. A study on what types of detergents and washing powders are used at the resort and whether phosphate free types could be used if they are not already is recommended. When released into the marine environment excess nitrogen can stimulate eutrophication and hinder the growth of coral reefs. Previously, wastewaters on Yanuca were sprayed onto golf courses at night. Taking into account the porous nature of limestone (the resort is on an uplifted calcareous limestone outcrop) a high percentage of these wastewaters make their way into the sea directly or indirectly through the water table.



Third pond planted with a variety of species.

Report of Sample Analysis dated 28th February 2002

	Pond Input	Pond Output	Change
<i>Nitrate (micrograms/litre)</i>	806	208	- 75%
<i>Phosphate (micrograms/litre)</i>	2256	2040	-10%

It was found that of all species in the wetlands the water hyacinth is the most successful at removing nutrients from wastewater. Water samples were analyzed when after the water hyacinth was removed and it was found that only about a third of nutrients in the wastewater were being removed. (i.e. reduction of nitrates from 75% to 25%). While the wetland system is working it is recommended that the system be monitored over a longer period as other important lessons can be learnt.

The Wai Bulabula artificial wetlands treatment system developed under this Darwin funded project is recognized, as one of the few of it's kind in Fiji and Pacific. There is a huge potential for treatment of wastewaters through artificial wetlands. FSP wishes to acknowledge the input of project consultants, Living Waters (UK) for introducing the concept of wetlands and the HEAL group of companies for supervising initial earth works.

The delays, which were caused by the political coup and the problems with the contracted consultants, resulted in the Wai Bulabula team devoting a higher percentage of their time to wetlands construction than previously planned. This has resulted in the further delay of the wetlands systems for villages. It is hoped that this aspect of the project will be developed as a follow on project from the Darwin project. With the skills and knowledge gained, the Wai Bulabula staff and the five men from Cuvu district (who worked as laborers to construct the wetlands) are now confident in constructing similar systems at village level.

A range of local plants is found in the ponds. The species are important for two purposes: (a) firstly, the treat waste waters (b) they have some usage local e.g. kuta grass used for plating the prized kuta mats, water hyacinth for plating baskets and ornamental flowers that can be used for floral arrangements. Water hyacinths require harvesting on a regularly basis. Plans are in the pipeline to conduct training workshops on plating for women from the local district. The handicrafts are intended to be displayed at the Fijian resort, and sold to tourists.

The wetlands system is further advantageous for it's eco friendly approach. When operating successfully the wetlands promote cleaner waters conducive for healthier marine ecosystems benefiting both local communities and the Shangri La's Fijian Resort. It is also low technology requiring minimum maintenance.

As a pilot project is has proven successful, having great potential in Fiji as it offers the private sector and local communities a means of treating waste adequately together with.

Problems: (a) Initially the Wai Bulabula project intended to construct a wetlands system for both the resort and a local community. Two overseas consultants who were appointed to design and supervise the construction were unfortunately unable to complete their contracts. As they was no qualified supervisor on site, FSP and Kanta's construction (local contractor) successfully struggled to work details of the ponds. This turned out beneficial because labourers including 5 men from Cuvu district were trained in building wetlands and it proved that the wetland systems can be constructed locally without the supervision of consultants which are often expensive (b) At one stage the wetlands became infested with mosquito larvae but this was solved by adding about 400 tilapia fish which biologically control the larvae. (c) For at least 2 weeks in July 2002 about half the fish population in the lakes died off. It was then decided to conduct waster sampling immediately so that an analysis could be conducted to determine the cause of the fish death. It is suspected that the cause of this may be due to oxygen deficiency in the ponds. FSP is currently awaiting results of the water testing.

LESSONS LEARNT

A number of useful lessons have been learnt while implementing both the Coral Gardens and Wai Bulabula projects. A summary of these lessons is as listed below:

- (a) **Comprehension period:** this is period of about 1-2 years of initial awareness raising and consultations with communities before they commit themselves to a community based project. This is when they realise and understand they are involved actively in decision-making and take full ownership at the end of project life. Implementing agencies such as non-governmental organisations, charitable groups, government ministries, institutions and regional organisations are only there to transfer knowledge and technical skills aimed at empowering resource owners to better manage and conserve their resources. The time factor may be seen as a delay however it is a necessary ingredient for sustainability.

Secondly, the fixed termed nature of project funding. Donor agencies must better understand how traditional systems operate and how this best fits in with their funding mechanisms. Projects are often funded for fixed periods, commonly 3 years. Donors anticipate full ownership by locals and implementing agencies to have achieved empowerment within such a time frame. Taking into account the concept of comprehension period one would realise that when communities have only begun to grasp the purpose of projects and need further guidance from implementing agencies, funding is on the verge of ceasing. When implementing agencies pull out from the project resource owners are only half way on the endeavour towards full ownerships of natural resources. The danger is facilitating agencies with drawing from the project before sustainability is achieved. Ironically the whole concept of sustainable development is defeated.

- (b) **Grass root (bottom up) approach:** for communities to feel a strong sense of ownership they must firstly be given the opportunity to actively participate in decisions making process. The Participatory Learning and Action (PLA) method ensures the voices of all groups are heard during workshops. As external bodies implementing agencies are there only as guide resource owners by offering technical skills and or training that is requested by them .i. e playing a facilitative role. It is not for external bodies to decide which what is important for the people. Rather the people should decide for themselves which resources or values are important and should be conserved. On the contrary for too long projects were implemented through a top down approach. This method is not successful for it does not allow communities an opportunity to actively voice their opinions and consequently do not feel a sense of ownership.

Local Protocols: Traditional communities such as Cuvu district are governed by local customs and protocols. It is essential to abide by these protocols. For example, despite communities accepting the marine conservation project (following initial consultations and discussions) it was traditionally endorsed at a district council meeting. The district council then appointed a district environmental committee that was appointed to oversee project activities and update the district council of project progress. During initial consultations, the Provincial Office was informed and updated of the proposed projects .In accordance with local government act as this office is a linkage between communities, government and external bodies. Adhering to local protocol has positive impacts in terms of support and assistance from relevant stakeholders.

- (c) **Need for widest possible level of stakeholder collaboration:** All community projects pertaining to natural resources include stakeholders that are consulted throughout some stage or life of the project. Basically these include resource owners, government ministries, non-governmental organisations and the private sector. The various stakeholders all have a role to play (offer various strengths) such as technical skills and training, knowledge, invaluable experience and other resources such as funding which are essential.

By conducting the widest possible level of collaboration one ensures that objectives are best achieved. Secondly, it was found that government support and participation is crucial. Without the department of Environment, Ministry of Agriculture & Health and Department of Fisheries the projects would not have been a success. Networking is not only a powerful but successful tool towards sustainable development.

- (d) **Importance of Linking project to existing and / or traditional practise:** helps communities understand and better relate the project to their circumstances. Two examples are as listed as follows (i) planting dalo (*Calocassia .spp*) and other related species along drains leading from washing areas or around former pit toilets is a common practise in Fijian villages. These plants consume nutrients such as phosphates and nitrates contained in wastewaters. Such nutrients are known to hinder coral growth and reproduction in certain fish species. This practice is in harmony with the Wai Bulabula project that aimed to conserve coral reefs by reducing land-based sources of pollution. (ii) the establishment of marine protected areas was practised by former communities but forgotten by recent generations. Villagers were well aware of the benefits of MPA's such as increasing supply of fish stocks. The project explained by the scientific reasoning to benefits of MPA sites.
- (e) **Incentives to maintain community commitment and active participation:** Without incentives there is a danger or possibility of communities losing interest or enthusiasm in the project. Equal emphasis must be placed on not only indoor activities such as awareness raising but also out door activities. Some incentives include organising village clean competitions, conducting specific training workshops to develop the skills and knowledge of resource owners, providing identification cards authorised by the department of Fisheries for fish wardens appointed to police their fishing grounds and establishing soil conservation sites whereby commercial farming is also accommodated.
- (f) **Ensuring the involvement of youths i.e. narrowing the gap between youth and older generation:** In the case of the Cuvu project it was found that youth have a misconception that decision making in the project was solely for elders. However, youths represent an important sector of the local community i.e. the future leaders of tomorrow. They acquire skills and learn at a faster pace than older generation. The Participatory approach of the project ensured participation of all groups including youths. A second option was to provide a forum for youths. This came in the form of a district Act group. It consisted largely of youths that were trained to perform drama's portraying environmental messages across the district, with schools and at workshops.
- (g) **A dynamic approach:** working with communities requires adaptive and flexible approaches. For example, capacity building is an ongoing process in the form of awareness, monitoring, and specific training workshops. Secondly, monitoring and evaluation is conducted through the project life. At times social and traditional obligation may take priority over project activities i.e. funeral, weddings.
- (h) **Addressing conflicts:** Conflicts are commonly experienced when natural resources are communally owned, especially in Melanesian communities. There is a possibility that not all will agree to developments concerning resources. Therefore it is necessary to have a conflict management team. Two types of conflicts are: (i) existing conflicts e.g. disputes over ownership of land and traditional fishing boundaries (ii) potential conflicts – these conflicts that have not occurred but are a risk e.g. disputes over water and drainage connection.

It is important for facilitating agencies such as governmental organisations and government departments to stress their neutral stand and not involve itself in sensitive issues such as communal disputes over ownership of land.

- (i) **Crucial importance of relationship between communities and implementing agencies:** the resource owners and implementing agencies are important stakeholders in community-based projects. Success depends to a large extent the relationship between the two parties. In turn the relationship is built upon virtues such as trust and confidence. It is important that external bodies do not raise the expectations of communities. If this continues then is likely to result communities losing faith and finally backing away from the project.

- (j) **Strong leadership:** community activities are likely progress steadily if there are effective leaders i.e. enthusiastic and committed to the project. Their guidance and involvement makes a big difference to the project.
- (k) **Avoid raising the expectations of communities:** it is crucial that facilitating agencies stress that all stakeholders must work together and do their roles for project objectives to be best achieved. There is a great danger of communities and other stakeholders losing interest in the project if the expectation of communities is raised.
- (l) **Relationship between communities and facilitating agencies:** at the end of the day success of the project is dependent largely upon the relationship established between stakeholders and communities. Communities want to know whether they can trust or find the facilitating agencies humble and easy to mingle with.

CONCLUSION

The Cuvu projects illustrate that best way forward in terms of sustainable development is partnership in development between government departments, resource owners and private sector (e.g. Shangri La's Fijian Resort). A strength of the project was participatory approach adopted that has created a sense of ownership amongst communities. However, difficulties were expected as (a) this project was unique being the first attempting to combine marine conservation with management of land based sources of pollution (b) secondly, conducted with a whole district as compared to a village within a district. A number of useful lessons have been learnt which can be reflected upon by FSP or other agencies intending to implement community based conservation project.

It is FSP Fiji's aim that this site will continue to develop and the reef will be restored, and that it will become a model of collaboration and partnership between all of the various stakeholders. Whilst the Coral Gardens Initiative is mid way through the project life the Wai Bulabula funding has ended. FSP Fiji is currently seeking further grants to further extend the Wai Bulabula project to communities. Areas of focus include watershed management and artificial wetlands treatment system at a community, as it was proven to work efficiently at the pilot site, the Shangri La's Fijian Resort.

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