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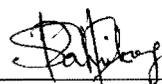
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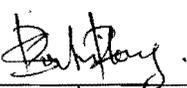
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**COMMUNITY-BASED COASTAL RESOURCES
MANAGEMENT IN FIJI ISLANDS: CASE STUDY
OF KOROLEVU-I-WAI DISTRICT, NADROGA**

Patrick Sakiusa Fong

A thesis submitted in partial fulfillment of the
requirements for the degree of
Master of Arts

Marine Affairs Programme
School of Marine Studies
Faculty of Islands and Oceans
The University of the South Pacific

March, 2006

DECLARATION

I declare that this thesis is based on my own original work and the main content contains no material that have been previously submitted for other degree at any other institution, excluding those work clearly cited and acknowledged in the text.

ABSTRACT

The community-based marine resources management strategy has been implemented in Fiji for the last decade. Despite all this effort, however, no detailed study has been conducted to examine the value of this management concept in sustaining the livelihood of coastal communities; the group who are directly affected by the implementation of this management approach. This study examines the impacts of community-based management on the social and economic standards of the people in the district of Korolevu-i-wai. It also scrutinizes and evaluates the social and economic factors that have contributed to the achievement of these impacts.

The result of the CBM initiative in the Korolevu-i-wai District has been successful with notable positive outcomes. The resource management through the CBM approach has created better overall outcomes at present (2004 onwards) than those of the former system and period. The study revealed that the social cohesion amongst the community members, the perceived condition of the fishery resources, the condition of the terrestrial and village environment and the community's understanding of the values of the marine environment and the resources associated with it have greatly improved in the district after the initialization of the CBM project. The average CPUE and income level of fishers in the district have also increased as results of the initiative.

The study confirmed that the key conditions for the achievement of the positive impacts of the CBM project in Korolevu-i-wai District are: political support through the recognition of the rights of the community to make development and management decisions regarding the *i qoliqoli*, economic status of the community, decision making group homogeneity, people's dependence on the marine resource as a source of income, availability of alternative sources of income, active participation of the community in project implementation and coordination and support and advice from outside agencies.

This thesis has established that there are vital links between the roles of the marine environment in the livelihood of the people, the impact of the people's management roles in the sustainability of the marine environment, and the social and economic elements associated with it. Recommendations are made for the effective implementation of the CBM concept through government and concerned institution policies and community settings in the hope of achieving long-term sustainable management of Fiji's marine resources for the betterment of the present and future generations.

ACKNOWLEDGEMENTS

“My help comes from the Lord, who made heaven and earth” (Psalms 121:2).

Foremost, HONOR AND GLORY to the GREAT ALMIGHTY for the strength and guidance throughout the period of completion of this work.

As the case with efforts that last for years, while my name will stand as the sole author of this thesis, the work involved was not possible without the untiring support of many individuals. Faults in explanation and conclusions in the ideas presented here are, however, mine alone.

My special thankfulness to Professor Bill Aalbersberg for obtaining funds to finance my study and also for giving advice, support and understanding during the entire phase of my programme. Gratitude also to The University of the South Pacific Research Committee (URC) for providing the additional funds for this research.

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Finally, my warm gratefulness to Kara for her support and patience during my lengthy hours away from home. Thank you so much for your lasting love and endurance.

Vina'a va'alevu...

DEDICATION

*To my dear parents (Fong Lin and Salanieta Rogonaivalu Fong)
for their indefatigable struggle in bringing me this far
... to you both, I am indebted for everything*

and

*to my dear wife (Karalaini Ina Rabo Fong)
for the continuous love, support and enthusiasm.*

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ACRONYMS

AusAID	Australian Agency for International Development
CBD	The Convention on Biological Diversity
CBM	Community-based Marine Management
CFRA	Customary Fishing Rights Area
CMT	Customary Marine Tenure
CPUE	Catch Per Unit Effort
DWFNs	Distant Water Fishing Nations
EEZ	Economic Exclusive Zones
EMA	Fiji Environmental Management Act
EU	European Union
FAO	Food and Agriculture Organization
FVB	Fiji Visitors Bureau
FLMMA	Fiji Locally Managed Marine Areas Network
GDP	Gross Domestic Product
GRA	Graduate Research Assistant
IAS	Institute of Applied Sciences
ICM	Integrated Coastal Management
IDA	Inside Demarcated Areas
KEC	Korolevu-i-wai Environment Committee
LMMA	Locally Managed Marine Area Network
MAC	Marine Aquarium Council
MARPOL	Convention for the Prevention of Marine Pollution
MPA	Marine Protected Area
NGOs	Non-government Organization
NLFC	Native Lands and Fisheries Commission
ODA	Outside Demarcated (Customary Fishing Rights) Area
PICs	Pacific Island Countries
PLA	Participatory Learning and Action
RFB	Regional Fisheries Bodies
RBF	Reserve Bank of Fiji
SPBCP	The South Pacific Biodiversity Conservation Programme
SPREP	South Pacific Regional Environment Programme

TAC	Total Allowable Catch
USP	The University of the South Pacific
UNCLOS	United Nations Convention of the Law of the Sea
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WSSD	World Summit on Sustainable Development
WWF	World Wildlife Fund for Nature

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CHAPTER 1: SETTING THE STUDY FOCUS

In Fiji, the marine and coastal ecosystems and the biological system that comprise them provide significant physical, economic, social and cultural benefits to the people and especially to the rural fishing communities. Some of the direct benefits include sources of food and income. However, over the years this very fragile system has come under severe threat resulting in the decrease of marine resource stocks. This situation is mainly due to unsustainable fishing and inland activities, the advent of cash-based economy, the increased ability to catch more fish through the utilization of sophisticated technological devices combined with insufficient implementation of legislation and regulations and the adoption of unsuccessful approaches to resources management over the years.

Over the past few years, management of the marine environment and its resources to counter the decline and collapse of marine resources fisheries has become the focus of national and concerned institutions' discussions in Fiji. The failure of management paradigms in the past has led to the search for new management approaches. In the last decade, the community-based management (CBM) approach has emerged as a "life saving" strategy to resource management and it is now widely advocated by management organizations in Fiji as the best way to achieve effective resource management (Veitayaki, 1998).

This research examines fisheries management in Fiji, with particular emphasis on the social and economic aspects of the CBM approach. This area is being recognized for its importance in achieving resource management goals and sustainable projects but is often neglected by modern management paradigms, which commonly focus only on the natural sciences. According to Uphoff (1998), CBM not only meets resource management goals, but also enhances the social and economic standards and environmental ethics of the community. In this research, which focuses specifically on the community-based project in Korolevu-i-wai district in Nadroga province, Fiji, I hope to explore the validity of this argument and I will also try and examine the underlying factors (social, economic, political and governance) that contribute to the achievement of these impacts.

Fisheries management in Fiji aims to allow living marine resources to continue to exist in numbers great enough for them to maintain their populations, and be a readily available food and income source for the people of the country. Management of the marine environment and its resources has been practiced in the Fiji Islands since the ancestors of the present Melanesian populations inhabited these islands. It has been important because of the small sizes of the islands and the limited resources available.

Today, although the large majority of islands and, especially, the smaller ones in the east and west of Fiji have plentiful supplies of most of their marine resources, there is a need for management because there are signs that fisheries are stressed and fish stocks are declining. Management is becoming even more important because of the economic, technological, environmental and social changes occurring as well as changes in the traditional use of marine resources. Income from fisheries is becoming increasingly important, as people have come to rely on cash for purchasing imported foods and goods. More efficient fishing gear such as gill nets means more fish can be caught in less time; and with availability of storing facilities such as freezers, a surplus of fish can be had, that is, more than can be eaten at one time (Veitayaki, 1995).

In the district of Korolevu-i-wai, effective resource management is critical in the sustainability of fish stocks, the livelihood of the communities and also in the million dollar tourism industry in the area. The people have now understood the issues that threaten their fishing ground and, over the years, they have been implementing and evaluating management actions for their effectiveness and ensuring management goals are accomplished.

RESEARCH FOCUS AND STUDY OBJECTIVES

According to the theoretical view of cultural determinism ‘the world is defined through cultural determinations’ (Milton, 1996). This theory has allowed me to study not only ‘the role of the environment in human affairs’ but also ‘the impact of human activity on the environment’ (Milton, 1996). In this study, the above mentioned human activity specifically means the attempt to manage the marine environment and the resources associated with it.

Community-based resource management is regarded by critics (Bradshaw, 2003 and Johnson, 2000) of the approach as having little conservation value to the modern scientific management paradigms because it is non-representative of the controlled areas and also because of the lack of science involved throughout the project process. One of the major aims of this research is to evaluate the impacts of CBM projects on the marine resources and, especially on the livelihoods of the people who depend on them. It is also hoped that this research will develop a better understanding of the true value of the concept in achieving modern management goals. The emphasis will be placed on the social and economic changes experienced by the community.

One of the main drawbacks of this concept in Fiji, however, is that the sustainability of community-based projects depends heavily on the vagaries of the elements that make up a society (economic, political, governance and social) and the outside world (national, regional and global). Establishing a system of community-based projects which is resilient to social disturbances needs to be synthesized and adopted. Johanessen (2004) in reviewing the status of the Waisomo, Ono CBM project, three years after the marine protected area (MPA) was gazetted, commented that the failure of the project was largely attributed to the change in local leadership and conflicts amongst institutions within and outside the community. This research, therefore, also aims to identify and examine the core social and economic elements that can contribute to the success and sustainability of community-based projects in Fiji.

Marine resources management and, in particular, CBM literature in Fiji is relatively poor with most emphasis more on studies done by academia. These include Veitayaki (1998, 2001), Veitayaki *et al.* (2002), South and Veitayaki (1998). These papers all dealt with the social, economic and legal aspects of the concept. Case studies by practitioners include those by Fong (1994), Tawake *et al.* (2001), Veitayaki *et al.* (2001), Tawake (2003) and Aalbersberg *et al.* (2005). For this study, an approach which is multi-disciplinary, and integrates the study of the majority of the topics covered in the above papers (which encompasses the social, political, governance and economic aspects of community-based management) will be adopted. Although community-based management is very critical to coastal communities and the country as a whole, very little detailed research has been done about it. The study also hopes to

contribute to the literature on this topic by looking at the threats to resources, the management institutions and approaches available, the socio-cultural interaction of the people with their resources, the socio-political interactions of management institutions within and outside the community and the social and economic effects of community-based projects to the livelihood of the people.

SCOPE OF RESEARCH

The research was based in and restricted to Korolevu-i-wai District for a number of reasons. Firstly, the culture and traditions of Fijians are not standard throughout the country, with variations noticeable between different *vanua*. Therefore, the way that each community addresses social and economic issues would be different from others. Also, there are wide gaps that exist in the economic settings of communities in Fiji. These two reasons were the main factors for the restriction of this study. The lack of financial support and time also led to the confinement of this research in Korolevu-i-wai District. A study of this nature with restricted scope is not necessarily representative of community-based projects in Fiji, hence, formulation of wider generalizations are made with the realization that sampling over a wider range of sites would yield results of wider applicability.

The reasons mentioned above together with the intention to thoroughly analyze community-based management projects made me adopt the focused or case study approach which would enable the detailed study of a system in a specific setting. I agree with Nunn (1987) quoted from Veitayaki (1990:4) that; "...small-scale studies provide complex, real world situations in a less complicated manner, thereby providing an easier opportunity for better insight into the functioning of the real world." The study of the Korolevu-i-wai District community-based management project is, therefore, hoped to provide insights and understanding of social and economic characteristics in a community and a reflection of the positive effects of such projects on the people. In selecting this case study, the criteria were based on the geographical location and the social and economic background settings of this area and the vulnerability of marine resources to permanent loss. Details of the study site are provided in Chapter 5.

METHODOLOGY

The types of research methods that were used to collect the necessary data and information needed for the study included:

1. literature survey
2. interviews using semi-structured and structured, pre-tested questionnaires with households, fishermen and key informants
3. focus group interview
4. creel survey.

This research was conducted from April 2004 to April 2005. During this period I worked as a Graduate Research Assistant (GRA) at The Institute of Applied Science (IAS) of The University of the South Pacific (USP). During my term as a GRA at IAS, I was part of a resource team which was responsible for the planning and, in consultation with the local residents, for the establishment of a community-based resource management project in the district of Korolevu-i-wai. Being part of this team really helped me a lot in working and collecting data in the district as people already knew me personally and the background of the work that IAS is involved in. I participated in the following meetings and workshops:

- Korolevu-i-wai management planning workshop- November, 2002
- Korolevu-i-wai district council biannual meeting- April 2004
- Korolevu-i-wai biological monitoring survey- March 2003
- Korolevu-i-wai social and economic monitoring survey- May, 2003
- Korolevu-i-wai Environment Committee meeting- March 2004

The literature survey was conducted via internet and library search primarily at USP. The existence of the internet was of great help to this activity. Since resource management is a wide topic, the relevant materials were drawn from a wide range of fields including anthropology, history, geography, international conventions, case studies and other management related disciplines.

The majority of data collected was from the district of Korolevu-i-wai, Nadroga after permission was asked through the presentation of a *i sevusevu* (yaqona gift for special traditional purposes) to the Tui Davutukia-i-wai. An oral presentation was then carried out at the *Bose ni Tikina* (District Council Meeting) prior to the actual data collection outlining the objectives of my study. This was done so that the people in the district were aware of my research. The in-depth interviews in the district were

conducted in the four villages in the district, namely Tagaqe, Votua, Vatu-o-lalai and Namada and also in other small settlements in the district including Qalito, Jafau and Nagasau. Even though the people who reside in these settlements are not customary custodians of the *Yavusa Davutukia i qoliqoli* (fishing ground), it was necessary to include them in the survey because their activities also have great impacts on the *i qoliqoli* and the project. Since Korolevu-i-wai hosts a lot of tourism activities, representatives from hotels and other business operators were also interviewed. This was done so that the views of those who have a stake in the marine environment in the area are well represented.

The households interviewed (Appendix 1.1) using questionnaires were selected through the random sampling method. All the households in each village were listed on separate pieces of paper, placed in a box and chosen by picking those households that need to be surveyed. Household in this context means “all people living and eating together within the same dwelling house” (Vunisea, 1996:6). A part of this questionnaire was extracted from the Fiji Locally Manage Marine Areas (FLMMA) Network social and economic monitoring questionnaire. The questionnaire was altered from time to time depending on the type of data I needed in that community and the background of the respondent. A total of 109 households were interviewed from the four villages and the three settlements representing 50% of the total households in the district (Table 1.1).

Table 1.1: *Number of households interviewed in Korolevu-i-wai district*

Village (V) and Settlement (S)	No. of Household Interviewed	Total Households
Tagaqe (V)	26	50
Votua (V)	22	44
Vatu-o-lalai (V)	18	36
Namada (V)	24	48
Qalito (S)	5	10
Jafau (S)	7	14
Nagasau (S)	6	12
Total Communities	109	216

The household questionnaire used (Appendix 1.1) was divided into four major sections. It was designed to obtain information on:

- i) general household information,
- ii) general information about the CBM project
- iii) perception on the social and economic impacts of the CBM project in the district,
- iv) household assets and social and economic enabling factors,

The key informants interview (Appendix 1.2) technique was used to gather general data at the district level with people who have first hand knowledge of activities that have been implemented by the project. A total of 37 key informants were interviewed in the district. For the most part, key informants interviews were conducted with homogenous groups, that is, members of the Korolevu-i-wai Environment Committee, village headmen, youth leaders, and leaders of other organizations within that village. The method allowed one to collect information through direct observations, informal conversations and discussions with key-informants. It was unique in that the interviews were usually conducted with individuals and groups, and this allowed the validation of answers as well as conversations not directly involving myself. The method not only eliminated an air of unnecessary and uncomfortable formality, but also provided participants with a chance to express views and opinions that were not necessarily envisioned.

A special questionnaire was designed for fishermen (Appendix 1.3) in the district. This was done to assess the impacts of their activities and how the project had affected their resources use patterns. It should be noted that fishermen in this thesis include those who conduct fishing as their household's main sources of income and for subsistence. A total of 23 fishers were interviewed, which 13 were fishermen and 10 were fisherwomen. Initial questions asked established the background information, such as the age and ethnicity of the participant. Questions then became increasingly occupation-specific, in an effort to understand trends regarding the different occupations and sources of income present in the area. For example, when attempting to better understand the livelihoods of the fishermen, questions were asked relating to the types of equipment used, the state of the market for fish products, and the enforcement of management rules. The interviewees were also asked to describe how they are affected by the community-based project, both positively and negatively.

Finally, interviewees described possible alternative sources of income, and made suggestions regarding the existing management of the project.

Rather than separating the questionnaire into one each for fishermen, household and key informants, the questionnaire encompasses all the three categories. However, the fish catch survey (Appendix 1.3) section was filled whenever I come across a respondent whose household depend on fishing as their main source of income and also if someone who fish regularly exist in a household that depend on other activities for source of income. A similar approach was used when a key informant was interviewed. Personal observations were also made while staying and living in these communities. I collected some information on a periodic basis, including the daily activities of community members. However, the majority of personal observations were made informally, and they consequently appear throughout the thesis rather than in a comprehensive table.

METHODS OF DATA ANALYSIS

Much of the data collected, especially that from interviews, is of a qualitative rather than quantitative nature. This presents certain barriers in performing statistical analyses, especially as there is only one project site examined. Most of the information gathered from interviews is presented in detailed charts and graphs (see Chapters Four and Five). These graphs and charts were created by compiling responses, and from them, extracting common parameters. Statistical analyses, mainly the t-test was then performed, and after trends were ascertained, conclusions and recommendations were drawn accordingly. Information from the more qualitative interviews appears throughout the thesis, and is not included in the statistical analyses. Finally, because of the large number of respondents and the use of diverse questionnaires, only information directly relevant to the original thesis question is presented.

CHAPTER SUMMARIES

In addition to this chapter, the thesis is presented in five other chapters.

Chapter Two: Coastal Resources Management in Theoretical Context

This chapter focuses on the theoretical aspects of marine resource management. It examines the changes in management paradigms over the years. It later scrutinizes

the view of the global community through analysis of some important international legal instruments. The notion of sustainable development is also highlighted in this chapter.

Chapter Three: The Roles of Community in Fisheries Management

Chapter three introduces the concept of CBM. It evaluates the need for communities to be involved in the decision making, implementation and evaluation of management strategies. The different aspects of CBM such as monitoring, the international perspectives, project cycle and success of the approach are detailed in this chapter. The chapter concludes by highlighting some of the challenges of this concept.

Chapter Four: Marine Resources Management in the Fiji Islands

Chapter four examines in detail marine resources management in Fiji. This covers the geography and social and economic settings of the country. It also describes the importance of fisheries to communities and the national economy and the human induced threats that are affecting the resources. The history of fisheries management in the country is also discussed together with the emergence of the community-based management projects in Fiji and contemporary fisheries and management issues.

Chapter Five: CBM in Korolevu-i-wai District, Nadroga, Fiji Islands

In order to understand the present-day impacts of the community-based management project on the district of Korolevu-i-wai district, it is necessary to examine the social, economic and political background of the district. This chapter provides such information and examines the perceived social and economic impacts of the CBM project on the people in the district and the factors that contribute to the achievement of these impacts.

Chapter 6: The Way Ahead: Consolidation of Existing Efforts

Using the information compiled in the previous five chapters, this chapter revisits the question of what are the social and economic impacts of the project on the people and what are the underlying social and economic factors that enable positive impacts. Also, I consider how these factors can contribute to the sustainability of these projects. Policy recommendations are then suggested for effective fisheries management and community-based management in Fiji.

CHAPTER 2: COASTAL RESOURCES MANAGEMENT IN THEORETICAL CONTEXT

Coastal resources management has become one of the major topics of international, regional, national and community discussion nowadays. This is in response to the fact that fisheries are collapsing and the marine resources from the sea are becoming scarce. This chapter establishes the background for the thesis and for the succeeding chapters. It first introduces the notion of fisheries management in terms of its theoretical context, and from a global perspective. It reviews the history of the development of the concept, examines some of the fisheries management tools and how the global community addresses it.

The chapter later discusses of some of the important legal instruments that provide the frameworks for the governance of the world's marine environment. The chapter concludes with a discussion of the notion of sustainable development in the context of coastal resources management.

THE WORLD FOOD SITUATION

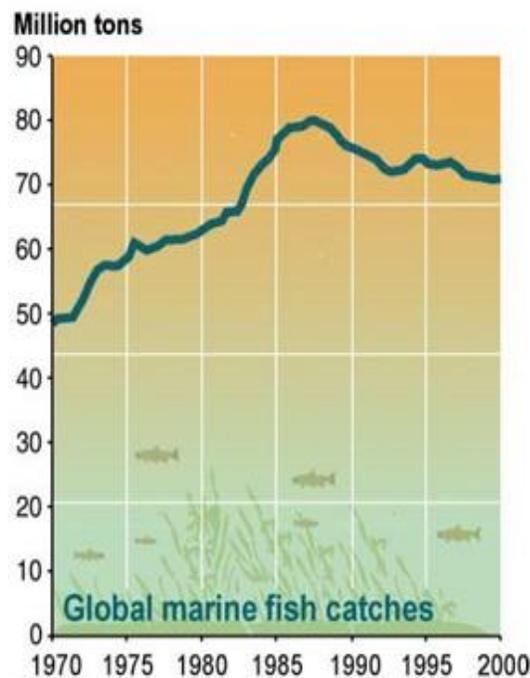
According to Vital Signs (1997), the world is experiencing a serious shortage of food. Hundreds of millions of people in developing countries live below the level of starvation, and the figure is increasing every year. In 1984, 500 million people did not get enough food (lived below the starvation level) and by 1996 this figure had risen to 800 million, an increase of 60% (Vital Signs, 1997).

The State of the World Report (FAO, 1997) noted that the decline is generally evident in two areas that are important for the global food production; which are grain and fish. For both these resources, their ability to produce appears to have reached their limit. The report further states that the amount of grain and fish per capita has decreased from year to year. This is supported by Koenig (2001:5) when he points to the fact that the biological production systems all over the world are about to be overloaded:

In country after country we now see signs that environmental pressures as well as technical/economic activities create increasing ecological as well as social problems. These are “growth related” problems which cannot simply be solved by more growth. Overcapacity is already a problem.

According to the State of the World Report (1997), the total world fish production reached about 100 million tonnes in 1989. This figure, which includes fish taken from inland waters, marine areas as well as aquaculture, has been maintained since then, and increased to 109 million tonnes in 1994. The marine catch (excluding aquaculture production) as indicated in Figure 2.1, reached 84 million tonnes in 1989. In 1990 it started to decline, and by 2000, catches had decreased by 4% despite the increase of the fishing effort, both in the number of fishing vessels as well as in the form of modern fishing technology practice (Millennium Ecosystem Assessment Report, 2005).

Figure 2.1: *Estimated global marine fish catch, 1950-2001*



Source: *Millennium ecosystem assessment report, 2005*

Several papers have also concluded that all over the world, fisheries are collapsing (Hutchings, 2000; Pauly *et al.* 1998; Pauly *et al.* 2002; Myers and Worm,

2003). According to the fisheries nomenclature of FAO (1997;9), the stages of fisheries correspond to "...developing (identification and intensification), mature (full exploitation) and senescent (overexploitation) fisheries". For several resources in the North Atlantic, the fisheries had already reached the mature state in the 1920s and by the 1970s there were only a few fisheries left which were not either mature or senescent. On a global scale, FAO (1997) assesses that 60% of all fisheries were mature or senescent by the mid 1990s.

The decrease in fish stocks can be largely due to human stimulated unsustainable fishing practices. Unsustainable fishing practices according to King (1999:3), "...can yield large economic gains for the individual fisher or company, but clearly this is for the short term". Analyzing this situation for the long term, continuous unsustainable practices will lead to decrease in fish stocks and with consequences in the economy as well as ecological losses and social problems (Spurgeon, 1997). For instance, experience has shown that overfishing lead to massive unemployment in Norway; overfishing of herring led to a collapse and moratorium on herring fishing for nearly 20 years (Hutchings, 2000). This led to economic damage for many fishermen and was a catastrophe for many coastal communities. Another example is the collapse of the cod fishery in Canada in 1992 (Spurgeon, 1997). This led to a total moratorium on fishing of cod on the Grand Banks and put 30,000-40,000 fishermen out of work and this problem is still ongoing today.

Scenarios similar to the above are also experienced in most tropical fisheries. On the west coast of India, the fishery off the coast of Goa has grown as the mechanized fishing vessels jumped from 10 boats in 1964 to 2,200 in 1998. Meanwhile, the annual catch increased from 17,000 tons to 95,000 tons, which is now well beyond the estimated maximum sustainable yield of 71,000 tons. At this harvest rate, this fishery will eventually collapse, and which will deprive India's coastal population of a sorely needed source of protein (Noronha, 2000).

In many areas of the Indo-Pacific region, it is also commonly agreed that most fisheries are on the verge of collapsing. The holothurian fishery is an example of such

fisheries and this conclusion has generally been drawn from export statistics and case studies (Conand 1990, 1998, 2001, 2004). The Philippines were once considered the second largest beche-de-mer exporters and recently, it was recommended that the fishery for this species be closed due to its scarcity (Gamboa *et al.* 2004 and Schoppe, 2000).

Indonesia is also one of the main exporters of sandfish (*Holothurian scabra*), however, minimal fisheries management exists and fishing takes place on many islands and often in small communities ((Novaczek *et al.* 2001). During a faunal survey in Sulawesi, Massin (1999) noted that sandfish had been overfished, and that in some locations it was regarded as a rare species. He further stated that according to fishermen and scientists contacted in that area, stocks on both islands are also extremely depleted.

In Malaysia, overfishing of *Holothuria scabra* stocks was mentioned by Forbes and Ilias (1999) and Poh-Sze (2004). According to the Poh-Sze (2004), curryfish (*Stichopus hermanni*) is exploited close to the point of extinction in Malaysia.

In New Caledonia, overfishing of sandfish has been claimed by Conand (1990, 1998) based on captures and catch per unit effort (CPUE) data. *Holothuria fuscogilva* was “scientifically overfished” according to Conand’s (1998) monthly sampling of this species, which showed a strong decrease in CPUE.

In Fiji, it was reported in 1993 (Steward, 1993) that catches of sandfish had declined by 80 per cent when compared to 1979. Bruckner *et al.* (2003) also stated that the total volume of sandfish exported by Fiji has decreased from 1295 metric tonnes in 1988 to 275.54 metric tonnes in 2001 as a result of decrease in stock. On a specific note, Bruckner *et al.* (2003) noted that *Holothurian scabra* catches rose to 700 tonnes in 1988 which resulted in the depletion of stock and in 1995 the Fiji Government issued a directive for the prohibition on the export of this species.

Managing fisheries was always perceived as a simple issue with the view that (Lacernal and La Vina, 2001:3), “...as long as there were more resources in the marine environment than the world population could hope to catch”. However, with many

Fiji's economy on natural resources and the environment is still an overriding feature and most of these commercial economic activities are located on the coast including tourism, fisheries, agriculture, industry, and infrastructure (Asian Development Bank, 2001). However, the country has a growing manufacturing sector oriented towards the export market, and the services sector, particularly tourism, contributes about 60 per cent of GDP (Bureau of Statistics, 2004).

Tourism, which is mainly a private driven sector, has grown significantly over the years and has now become Fiji's largest gross foreign exchange earner. The tourism industry is highly focused on the western region of Fiji namely Nadi, the Mamanuca Island Group, and the Coral Coast in Nadroga. The industry has delivered economic benefits to most rural Fijians in these areas. In 2004, the tourism industry contributed approximately 26% of Fiji's GDP and 47% of foreign exchange with estimated earnings of FJD869.5 million (Bureau of Statistics, 2005).

Tourism provides employment directly and indirectly to around 50,000 people (The Fiji Times, 2005). Visitor arrivals have recorded a steady growth reaching a record level of 531,914 in 2005 (The Fiji Times, 2006). Recently, a number of new hotels have been built in the country and most of these major resorts are situated on the coast. Therefore, the sustainability of this sector depends heavily on the state of coastal areas and proper management of coastal uses. Ecotourism is an important and growing form of tourism in Fiji which requires the proper protection of the natural resources.

Agriculture is the second largest sector of Fiji's economy, accounting for 22% of foreign exchange and contributing 16% of Fiji's GDP (Ministry of Agriculture, 2004). 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 an annual production of 0.33 million tons in 2000 (Fiji Bureau of Statistics, 2001). The industry generated sales revenue in excess of FJD280 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 FJD8.8 million. In 1999, 245 tonnes of *yaqona* were exported (Fiji Bureau of Statistics, 2002b).

The fisheries industry is the fourth largest sector of Fiji's economy. In 2002, the domestic commercial catch of fresh and frozen finfish was around 6665 tonnes worth FJD27.9 million and for non-fish approximately 4870 tonnes worth FJD6.2 million (Fiji Department of Fisheries, 2003). The main species caught include several inshore finfish species, mangrove crab, prawns, bivalves and beach-de-mer. It is estimated that FJD87.5 million worth of sashimi tuna and FJD7 million of tuna loin product were exported to mainly Japan and the United States markets in 2002. Export of aquarium fish was worth FJD519, 000 (Department of Fisheries, 2003).

Manufacturing is now a significant part of Fiji's economy contributing 15% of GDP and employing around 28,000 people (Bureau of Statistics, 2004). 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 result of the political crisis (Ministry of National Planning 2001). Given below is the summary of Fiji's main export products (FJD million) over the years.

Table 4.1: Fiji's main export over the years

	2003	2002	2001	2000	1999	1998	1997
Sugar	230.7	235.0	222.0	237.5	263.2	244.2	213.4
Gold	76.5	78.1	85.4	75.7	76.4	70.5	74.0
Garments	252.7	245.4	313.9	332.9	322.1	302.8	200.1
Fish	85.0	89.9	98.4	88.8	57.5	49.5	50.4
Lumber	33.2	41.5	41.3	44.9	35.6	54.7	34.0
Molasses	10.1	12.4	9.5	9.7	12.4	10.6	12.7
Coconut Oil	4.0	5.9	2.4	3.6	9.7	9.1	5.7
Others	250.3	234.9	234.9	232.4	170.8	164.2	167.3
Total	942.5	943.1	1007.8	1025.5	947.6	905.6	757.6

Source: Fiji Islands Revenue and Customs Authority, 2004

IMPORTANCE OF THE MARINE SECTOR IN FIJI

Under the Ministry of Fisheries and Forests Strategic Development Plan 2005-2007 (2003:3), the objectives of the Department of Fisheries are to: 1) promote marine biodiversity through better conservation and management of resources; 2) develop and use appropriate legislation, monitoring, surveillance, enforcement and practices consistent with International and Regional standards that are conducive to developing credibility of the fisheries sector; 3) explore market access and market opportunities for all products developed from our resources targeting the retail end of the market chain; 4) develop Fiji as a service center for all the high value fishing activities in the Pacific region; 5) create employment in the rural areas through resource development; 6) improve food security, supply and source through reseeded, restocking and culture of fisheries. These objectives govern the development of marine resources in Fiji. They clearly show the internal conflict that exists in a sector where increased production is necessary for short term economic gain for the country, while sustainable development through the implementation of management strategies is also necessary for the long term survival of the sector.

Even though the development of the fisheries sector has often been neglected or given low priority by government, it should be known that fisheries activities plays a pivotal role in the development of most coastal fishing households in Fiji. Aalbersberg *et al.* (2005) estimated that more than 50% of household income for Fiji's coastal villagers is derived from their marine environment. It is a major source of sustenance for most rural coastal communities in Fiji. It is also a major dish in restaurants and cafeterias, and a much expected meal in most households in urban centers around the country. More than half of the population lives in rural areas and depends on small-scale commercial and subsistence fishing for both livelihood and over 75% of dietary protein (Aalbersberg *et al.* 2005). In Fiji the average fish consumption is 40 kg/yr per head which is greater than the average for Japan. In some areas of Fiji, such as Lau and northern coast of Vanua Levu, the average may be as high as 100kg/yr (Zann, 2004).

Fish is widely consumed because it is plentiful and easy to obtain in coastal waters for villagers. The 49% of Fijians are working and earning in urban centers are

able to buy fish from local markets and roadsides. Fish meat is considered to provide the best of all animal protein because of its richness in essential nutrients.

Table 4.2: Important nutrients in 100g of various meats

Nutrients	Anadara spp.	Mutton	Tuna	Chicken
Protein (g)	14.3	19.8	27.2	16.4
Fat (g)	0.9	17.7	3.7	12.6
Sugars (g)	<0.1	0.5	2.1	<0.1
Starch (g)	<0.1	1.0	<0.1	11.2
Thiamin (mg)	<0.02	0.13	0.06	0.03
Riboflavin (mg)	0.13	0.11	<0.021	0.08
Vit C (mg)	<1	12	<1	4
Sodium (mg)	1052	832	593	623
Potassium (mg)	253	191	368	230
Calcium (mg)	2	5	2	36
Iron (mg)	21	3.6	<0.1	2.3
Magnesium (mg)	106	15	40	21
Copper (mg)	0.7	0.4	0.7	0.4
Cholesterol (mg)	59	98	98	-
Energy (kJ)	262	997	606	919

Source: English *et al.*, 1996

The fishing sector provides employment directly and indirectly to most households in Fiji. It is estimated that there are 895 fishing boats operating in Fiji's artisanal fishery and employing 2137 crew directly. Offshore longliners employ a total of 510 domestic crew, in addition to the international crew employed on locally owned, joint venture and charter vessels. It is estimated that there are 30 commercial charter and sportfishing boats operating in Fiji and employing about 60 people. People affected indirectly by the sector include workers in the 16 municipal markets, processing companies and mechanical companies. The total employee in the various fish processors is estimated at 1394, including the 800 permanent Pacific Fish Company (PAFCO) in Levuka (Hand *et al.* 2005).

Fishing is Fiji's third most valuable export industry, with an export value of FJ\$98.4 million in 2001, but decreasing to FJ\$85 million in 2003. The details of Fiji's marine product exports are already described above, and include a large contribution from the tuna fishery. Overall, fishing contributed 2.7% to the country's GDP in 2001

(Gillet and Lightfoot, 2002) and this GDP per capita is the highest of any of the Pacific countries (Bureau of Statistics, 2002a). However, the recent contribution of fish to exports has tended to level off as a result of the El Nino that shifted tuna stocks eastwards away from Fiji (Hunt, 1999) and also due to the scarcity of resources in most of Fiji's inshore waters. The scarcity of marine resources in Fiji is largely caused by a combination of human-induced and natural threats.

HUMAN INDUCED THREATS TO MARINE RESOURCES

There is very little quantitative data available on the extent and intensity of threats to Fiji's marine resources. This is due to the large size of its marine area, the lack of knowledge of the resources, and insufficient data on the use of marine species and environmental impacts of fishing (Watling and Chape, 1992; Gillett, 1997). However, through community consultations, it is evident that the inshore marine environment throughout Fiji and its resources are in a very fragile state. The majority of threats to marine resources in Fiji today are human induced unsustainable practices and most of these activities have severe consequences to the marine environment. Through personal observations, discussion with local communities and project managers and review of community workshop reports, a list of threats has been compiled (see below). Each of these activities may independently threaten ecosystem structure and function. However, more significant impacts are often the result of the compounded effects of multiple activities. Some of the changes caused by periodic climate events are not necessarily permanent. However, direct human-induced stresses to habitats intensify the effects of these events or limit the recovery capability of marine ecosystems (Hunt, 1999).

Human induced threats:

- Overexploitation of marine resources
- Pollution (nutrient and chemical pollutants)
- Use of destructive fishing methods (derris root and dynamite, gillnet)
- Coral harvesting
- Coastal development
- Mangrove cutting
- Tourism development

Overexploitation

Overexploitation is a concept in fishery science that is still debated. Basically, overexploitation can be of either a biological or economic origin and therefore, has different characteristics in different localities (Conand, 1990). It is generally agreed that the majority of *i qoliqoli* in Fiji are overexploited in biological terms which means the fish abundance and sizes have decreased dramatically (Zann and Vuki, 1998; Dalzell *et al.* 1996). This conclusion has generally been drawn from total catch statistics in the Department of Fisheries Annual Reports and certain community management planning workshop reports.

The table below shows the decline in inshore fisheries catch over the years as worked out from the annual landing of inshore marine fish in municipal markets and the number of Inside Demarcated Areas (IDA) license holders. All data were extracted from the Department of Fisheries Annual Report of the years listed in the table. Data are also represented in graphic form.

Table 4.3: Annual landings of Inside Demarcated Areas license holders over the years

Year	Annual Market Landings of Inshore Marine Fish (metric tons)	Number of IDA License Holders	Average Catch (MT) per License Holder (IDA)
1976	87	753	0.11
1981	1132	1319	0.9
1986	9630	1062	9.1
1988	8980	1451	6.2
1990	4810	1072	4.5
1992	5730	1397	4.1
1996	4548	1137	4
1998	6100	1597	3.8
2000	2541	762	3.3
2003	5100	1731	2.9

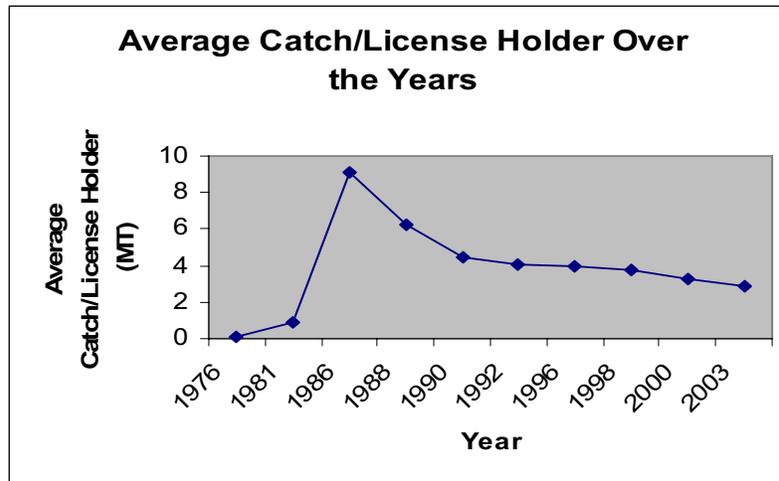


Figure 4.2: Average catch per license holder in Fiji over the years

The above graph shows that the average landing per license holder was highest in 1986. In 1987 the catch level started to decline, and by 2003 catches had decreased by 3% in spite of an increase in the number of fishermen and the use of improved modern fishing technology.

The marine resources in Fiji have been depleted due to subsistence, artisanal and commercial fishing pressures related to the increase in the size of fishing communities. Examples of these resources include bêche-de-mer, trochus, giant clams, coral, shells and live fish. Steward (1993) mentioned that catches of sandfish had declined by 80 per cent when compared to 1979. Locally, giant clams (*Tridacna gigas* and *Hippopus hippopus*) have become extinct and coconut crabs and some other resources have become endangered in the country due to overharvesting. Previously permitted commercial harvesting of turtles has resulted in an alarming reduction in the population of the once plentiful green and hawksbill populations.

Widespread over-exploitation of many target species in Fiji is caused by the removal of breeding age individuals which has a significant and direct impact on the sustainability of the stock. With reduced numbers of these target species, fishing pressure often increases as fishers search previously untouched and remote areas, or develop more aggressive fishing methods (Lal, 1990; Lambeth and Santiago, 2001; Veitayaki, 1995). The fishermen selling fish in the Nabukalou Creek in downtown

Suva go as far as the Lau Group, islands in the Lomaiviti province and Kadavu Islands to fish as a result of scarcity of resources in the Suva area and neighboring waters. These fishermen fish illegally in these waters, hence, are equip with sophisticated fishing gear that enable quick extraction of target species and departure from the area before resource owners are aware or feel suspicious of their activities.

In Fijian coastal communities, the need for cash to meet the growing social and household obligations is a major factor that contributes to overfishing. Hornel (1940:26) in describing Fijians sixty years ago mentioned that:

So few and so simple are their wants that a minimum of effort suffices to supply them. Money of itself furnishes no incentive. Therefore, until they come to value money as a means to the attainment of wants at present not desired, we cannot expect them to awaken from their present apathy and indifference to the riches which the sea offers to their grasp at the expense of regular and sustained effort.

However, the advent of a strong financial incentive in Fiji today, that is, high return relative to effort, has led to high levels of fishing pressure in most internal waters, which would not have occurred in a purely subsistence economy (South *et al.* 1994). Contemporary Fijian communities' need for money is increasing every year and this is largely due to monetary value obligations of the family, *vanua*, government and the church. These social obligations not only lead to overexploitation of resources for more monetary gain, but are also a leading factor in the poorer condition of Fijian communities, especially in individual economic development.

Use of Destructive Fishing Methods

Regulation 8 of the Fisheries Act of Fiji (1992) states that:

No person shall take, stupefy or kill any fish in any lake, pool, pond, river, stream or in the sea use of any following substances or plants:

- a). any chemical or chemical compound;
- b). any substance containing derris;
- c). any substance containing the active principal of derris, namely rotenone;
- d). any plant or extract of or derivative from any plant, belonging to the genera Barrigtonia, Derris (*Duva*), Euphorbia, Pittosporum or Tephrosia or place any such substances or plants in water for the purpose of taking, stupefying or killing of any fish.

Although these activities are prohibited, they are still prevalent and widespread in Fiji (Zann, 2004). Destructive fishing practices are employed in most parts of Fiji to obtain larger harvests in shorter periods of time to meet commercial demands locally and overseas, causing unnecessary damage to habitats such as coral reefs. Other destructive fishing practices employed by most fishermen in Fiji are the improper use of gillnets, SCUBA (Self Contained Underwater Breathing Apparatus) and hookah gear and the fishing of undersized fish.

Blast fishing or the use of dynamite is common in the Western Division and this is largely due to the presence of the Emperor Gold Mining Company in Vatukoula which is the source of the explosive materials. The goldmine workers are always the ones responsible for the leakage of these explosives to the public. The Department of Fisheries in the past years has developed procedures for the identification of fish killed by dynamite and prosecution of people in possession of such fish; however, this has not been very effective due to the lack of man power and resources in the department to carry out these tasks.

The use of *duva* (*derris root*; a creeper that grows wild in most islands and is a source of rotenone) to poison fish is a common practice in most *i qoliqolis* in Fiji. It is argued by most villagers that it is a traditional fishing method, even though its origin cannot be traced. An extract of the roots is used to stupefy or even kill target species and also non-target marine organisms including small and juvenile fish and corals. Blast and poison fishing on coral reefs inherently destroy corals and kill fish and invertebrates in a large surrounding area. The resulting changes may lead to a decrease in biological diversity through changes in ecosystem dynamics.

The use of fishing nets, particularly small-mesh gillnets, is a very productive method of fishing and its efficiency has caused the overfishing of certain areas in Fiji. Using undersized nets (measuring less than 2 inches, measured by pulling diagonally opposite knots of the mesh apart as stated in the legislation) leads to the harvesting of undersize fish. These nets are left overnight in the hope of catching more fish. The combination of the above activities causes drastic effects to the marine environment. It was because of the awareness of this threat that the people of the combined *i qoliqoli* of

the *vanua* Macuata, Nabekavu, Dreketi, Mali and Sasa banned the use of gillnets in their fishing ground (Fong, 1994).

Recently, the uses of SCUBA and compressor have become a threat to Fiji's marine resources. The introduction of these apparatuses for recreational purposes in hotels and resorts has been abused by the locals and most communities use them for fishing purposes. The use of these pieces of equipment has affected marine stocks and is noticeable in sea cucumbers (species of *Holothuria fuscogilva* and *Holothuria scabra*) which have high market value. These pieces of equipment can also affect the health of the user if used improperly. In the mid 1990s, it was becoming common to hear in local media the news of fishermen being admitted to hospitals because of nitrogen intoxication as a result of improper usage of these apparatuses which allow fishermen to dive much deeper and stay longer underwater to collect sedentary resources which are out of the reach by snorkel divers. This practice does not allow the "mother stock" to breed and supply juveniles for the next generation; hence, these resources are vulnerable to overfishing or even extinction.

Coral Harvesting and Live Rock Extraction

The aquarium trade demands a lot from Fiji's reefs. Fish, coral and 'live rock' (coral base covered with coralline algae – an efficient biofilter useful for keeping the water in aquarium tanks clean) are all taken from the reef for this trade. Walt Smith International, based in Lautoka, is the largest and most successful ornamental business in Fiji taking corals and live rock from the reefs, particularly in those villages along the Coral Coast. This trade is regulated by the Marine Aquarium Council (MAC), which is responsible for certifying businesses in the aquarium trade and making sure they are taking sustainably.

The coral and live rock trade is an important source of income for exporters and local villagers, including the *i qoliqoli* owners. Lal and Cerelala (2005) estimated that the total export value of live rock and coral products exported in 2003 from Fiji was about \$8 million. Out of this, members of rural resource owners from 25 *i qoliqolis* received a total gross income estimated to be about \$1.1 million, \$909,000 from live rock and \$200,000 from coral and other invertebrates. In addition, *i qoliqoli* chiefs

received \$111,000 in goodwill payments. Lal and Cerelala (2005) further estimated that a typical villager can earn a net income of about \$25,000 a year from live coral, while a villager involved in the live rock harvest earns about \$21,000 per household.

One of the major risks of this trade is the demand by export companies for good quality the rock and corals. The demand is for at least 60% of the rock surface to be covered with the coralline algae. Therefore, if low quality rock is taken, it is rejected by the exporter, creating waste and unnecessary collection. Another threat for these resources is the demand for local uses. Coral forms strong building materials for lime kilns, house foundations, street embankments and fishponds.

Mangrove Cutting

Mangrove cutting and destruction is common in most places throughout Fiji. These mangroves are used for firewood in coconut driers and household kitchens and dye for the *tapa* industry. Most of the mangroves sold in urban centers are supplied from villages, for instance, in Suva, mangrove firewood sold in markets and retail shops is being supplied by villagers from Laucala village and other neighboring villages in the lower Rewa Delta area. Even though this is a small industry, the demand is consistent. If this trend continues for another few years, a large portion of mangrove in these areas will be removed, together with associated organisms.

In urban centers throughout Fiji, reclamation of land through the cutting and burying of mangrove forests is becoming a common practice. It is estimated that 38,543 ha of mangrove, which is approximately 10% of the total mangrove forest in Fiji, has been reclaimed (Watling and Chape, 1992). The demand for land for construction is the key factor for the destruction of these areas. These areas include the Nadawa Housing Subdivision, Vatuwaqa residential area and part of the Walu Bay industrial area in the Suva area and the Fiji Forest Industry factory and the Namara residential area in Labasa to name a few. Land reclamation does not occur often; however, the effect of a major reclamation to the marine resources is massive.

Pollution

Point-source pollution (sewage, mining, industrial discharges, litter refuse disposal sites), non-point source pollution (fertilizers, herbicides, urban run-off), and the siltation of waterways and coastal areas from agricultural practices, logging and clearing of riparian vegetation, are causing the degradation and loss of important habitat in most *i qoliqolis* in Fiji. Pollution is heavy in more populated and industrialized areas around the country. Mosley and Aalbersberg (2002:1) mentioned that:

Nutrient (nitrate and phosphate) levels potentially damaging to coral reefs have been detected at several sites along the Coral Coast of Viti Levu, Fiji.... Nutrient levels were highest at sites located near hotels and other populated sites.

Wilhelmus (2000:5) also pointed out that:

The disposal of untreated human and domestic waste is the largest contributor to the pollution of the marine environment in Fiji. There are numerous problems associated with human and domestic waste. The Raiwaqa sewage treatment plant is inadequate. In places where there are septic tanks and latrines they tend to overflow and in many of the coastal villages in rural settings, due to lack of proper facilities, human waste gets directly discharged into the sea either directly or through streams, rivers and storm drains.

Located downstream from land, the sea unavoidably becomes the dumping place of human-generated pollutants via runoffs and through direct dumping, especially in small island nations like Fiji. Many of these pollutants pose direct human-health risks. Untreated sewage contains bacteria, parasites and viruses. The greatest impact is usually on the fringing reef, which is used for catching fish and shellfish for sustenance. Shellfish from these areas are contaminated with bacteria and viruses from sewage. Consuming raw or partially raw shellfish can lead to transmission of viral diseases. Also, since shellfish are near the bottom of the food chain, the contamination also has many effects on other fish species. Untreated sewage also contains high levels of nutrients, which stimulate massive algae growth. This leads ultimately to a decreased oxygen level. These anoxic conditions can lead to fish kills. Massive algal growth can also smother corals and kill them.

Oil and chemical spills and the deliberate discharge of oily ballast water by ships pose a potential, but poorly documented threat to major ports in Fiji. This threat, though important, is thought to be less significant than land-based sources of pollution. Spills from ships are due to the carelessness of the owner or company to take necessary precautions to avoid such events from happening. Also, there is a lack of laws to prosecute polluters in Fiji. Nawadra (2004) states that a review of ship waste management in the Pacific region to examine obligations and compliance of Pacific Island countries to the International Convention for the Prevention of Pollution from ships 1973/78 (MARPOL 1973/78) showed no compliance by any of the countries including Fiji. One of the key obligations of MARPOL 1973/78 is the provision of “adequate” ships waste reception facilities which major ports in Fiji lack. Studies (Baines and Morrison, 1990; Aalbersberg *et al.* 2003; Kumar *et al.* 2004) have also shown that pollution in Fiji pose major health risks and threat to biodiversity. This problem, however, cannot be solved by legislation, alone but requires public education to increase awareness about pollution and change behavior patterns.

Agricultural Activities

For a long period of time, agriculture contributed a lot to the economy of the country. This has led to the increase of farming areas by more than 200% over the past 40 years, partly due to marginal land being brought under cultivation. In most cases, farmers in Fiji lack knowledge of the environmental impacts of their practices. This is because responsible government ministries instill in them over the years the concept of higher production rather than sustainable practices. For instance, the use of pesticides and herbicides is a common practice in most farms in Fiji including sugar cane farms near the coast and *yaqona* farms in the interior of the main islands. These chemicals, when washed to the sea during heavy rains, lead to problems such as fish kills and fast growth of *Sargassum* seaweed, which smothers corals and other benthic organisms (Mosley and Aalbersberg, 2002).

The expansion of agricultural activities in steep areas and areas close to rivers and other unsustainable land use practices utilized in Fiji have also led to soil erosion and siltation in most fishing areas close to major rivers, leading to the destruction of marine habitats and associated resources. Legislation for land management already

exists. The Fiji Ministry of Agriculture recognizes that problems of land and water degradation exist in Fiji through unsustainable agricultural practices, and policies have already been formulated to minimize them and their impacts. However, farmers in Fiji like in other developing nations do not enjoy the same choices as farmers from developed nations because the markets are limited and only a few crops have valuable markets. Moreover, there are no specific financial incentives for farmers in Fiji to manage their land well. Therefore, many challenges lie ahead for agricultural activities in Fiji to ensure long-term sustainability.

Coastal development

Approximately 82% of Fiji's population live within 10 kilometers of the coast. Such a dense coastal population and the attraction of the coast as a travel destination exert increasing direct and indirect pressures on marine and coastal ecosystems through extensive coastal development. Direct physical alteration and destruction of fishing grounds occur in Fiji's coastal areas through dredging for shipping channels and harbours, construction of infrastructure such as roads, houses and hotels, land reclamation or in filling of shallow habitats for coastal building, and contamination of water sources. For instance, it is estimated that 70% of Fiji's main road, the Queens Highway, is constructed within 10 kilometers from the coast, hence the effect of this on coastal areas along this highway is enormous and is still a continuous issue today.

Tourism Development

Even though tourism is Fiji's greatest revenue earner, it also has a great direct human impact on the marine environment and its resources. In 2003, 430,800 visitors arrived in Fiji. A large percentage of tourists take trips to reefs at some point during their stay. Unfortunately, many of these tourists are uneducated in proper reef etiquette, and it is left to the dive operator to instruct the passengers on how to properly conduct themselves when swimming around the reef. However, this practice is rarely done. This leads to the damaging of reefs through the touching, kicking and grabbing of the reef to get a better look, gain stability and buoyancy in the water or collect a "souvenir" by these uninformed divers and snorkelers (Levett and McNally, 2003).

Anchor damage and fuel pollution are other factors that contribute to the destruction of the marine ecosystem. Some operators use permanent moorings at their dive sites but most do not. Considering that the average dive operator may visit the same spot several times in a week it is important to realize what happens when they throw their anchor onto the reef on each trip. A dragged anchor can clear several square meters of the reef as the boat is pushed around by wave action, or when the anchor is being pulled into the boat (Levett and McNally, 2003).

The disposal of human waste generated by the thousands of tourists visiting islands and coastal resorts, combined with those from densely populated villages in tourism regions, is also a big issue in Fiji. Many of these resorts simply pump their raw sewerage after minimal treatment into the sea via a drainage pipeline. This presents a health problem as well as incidental reef destruction that needs to be addressed in a more environmentally friendly manner.

OWNERSHIP OF THREATENED *I QOLIQOLI*

Customary Marine Tenure (CMT) System in Fiji

Customary marine tenure systems have been described as "...the ways in which inshore fishers perceive, name, partition, own and defend local seas space and resources" (Cordell and McKean, 1982:4). It is the combination of a host of cultural, historical, geographical, biological, legal and technical components (MRAG, 1999a). Cooke *et al.* (2000), Pinkerton (1989) and others (e.g. Munro and Fakahau, 1993) have argued that CMT systems should be viewed positively by governments since they provide a vehicle by which state and customary stakeholders may work in partnership to share the burden of management (Sen and Nielsen, 1996), in what is termed co-operative management or co-management (Jentoft, 1989) or community based management.

Indigenous Fijians have a long history of traditional fisheries rights and allocation or the CMT system. During the English colonization of the country, community authority and rights were taken by the national government as a result of the Cession of Fiji to the British Empire. However, the colonial administrators who wrote the Fisheries Act in 1941 were very careful to recognize the customary right of

Fijians to fish in traditional fishing grounds. This administrative structure of authority over fishing grounds remains in place today, and the established system of traditional fishing grounds known as *i qoliqoli* enjoys some legal recognition, officially referred to as the customary fishing rights areas (CFRAs).

The coastal and foreshore water resources are shared under dual ownership, where the state owns the seabed and all the Fijians have the right to fish in their own customary fishing rights area. In Fiji, there are a total of 410 *i qoliqolis*. Another customary marine tenure system in Fiji is the Fijians' recognition of their *i kanakana* which is the immediate reefs in front of their village. Even though, this arrangement does not have legal recognition, Fijians in coastal villages still know and are familiar with the boundaries of their *i kanakana*. Fishing in the *i kanakana* by neighboring villages without seeking the approval of the village chief by means of the social channel of communication is perceived as showing disrespect and insulting even if these neighboring villages are from the same *i qoliqoli*.

The *i qoliqoli* system is probably the most comprehensive legal recognition of customary fishing rights in the world. The customary fishing rights law in Fiji is executed by the Fisheries Division, the Native Lands and Fisheries Commission (NLFC) and District Administrations. The NLFC has the responsibility of getting fishing rights areas surveyed, holding inquiries to settle boundaries with traditional owners, maintaining a register of all owners, and handling appeals. In other words, it is responsible for deciding the ownership and boundaries of fishing rights areas, in consultation with the people.

Most decisions regarding *i qoliqoli* and their use are made by the locals or owners of CFRAs. The Fisheries Act allows the owners of customary fishing rights to advise the District Commissioner or the Fisheries Division which commercial fishermen shall be allowed to fish in their area, and also to impose restrictions on commercial fishermen (Gonelevu, 1989; Fong, 1994). These restrictions were not often imposed by resource custodians in the past decades, but most have recently made use of this power for it is a very useful way of controlling exploitation of resources.

Restrictions could be excluding a fisherman from certain areas within the overall customary fishing rights area, or excluding a fisherman from taking certain species, such as a ban on live coral/rock collection, and or excluding a fisherman from using certain fishing gears. For instance, in the early 1980s, the people of Sasa, Macuata, decided to impose a ban on the use of gillnets in their fishing grounds (Fong, 1994). Recently, the people of Votua village in Ba have included restrictions on the use of certain fishing methods and fishing in certain areas in their licenses so that license holders are more aware of the resource management strategies that are implemented by the people (Veitayaki *et al.* 2001). This traditional fishing rights system can be a powerful tool for fisheries resource management if used responsibly. The power has already been put in the hands of the people and fishing rights owners should work together to prevent overfishing and ensure the future of the resource for generations to come (Naqasima and Vuki, 2002).

In the past, this system was the most widespread and important measure for the conservation of marine resources because access was controlled through CMT arrangements (Hviding and Ruddle, 1991). The rights to fish were controlled by a clan, chief or family. Because CMT is basically a private property system with rights being held and inherited by a certain group, it has been hailed that it is a system that should facilitate good management of marine resources, since the “tragedy of the commons” that characteristically encourages open access systems is theoretically avoided (Ruddle and Johannes, 1990, South *et al.* 1994). Johannes (1981:9) observed that:

The most important form of marine conservation used in many other Pacific islands, was reef and lagoon tenure. The method is so simple that its virtues went almost unnoticed by Westerners. Yet it is probably the most valuable fisheries management measures ever devised. Quite simply, the rights to fish in an area is controlled and no outsiders are allowed to fish without permission. Where such tenure of marine fishing grounds exists it is in the best interests of those who control it not to overfish. The penalty for doing so – reduced yields in the future – accrues directly and entirely to the fishing ground owners. Self-interest thus dictates conservation. In contrast, where resources are public property, as is the case in Western countries, it is in the best interest of the fishermen to catch all he can. Because he cannot control the fishery, the fish he refrains from catching will most likely be caught by someone else. Self-interest dictates overfishing and leads to shrinking yields.

The concept of the CMT system can be clearly understood to encourage effective management of the overarching fish stock in the country, as Hviding (1989:9) had opined:

I believe that this debate, which tended to defend or dismantle the “credibility” of CMT systems in terms of whether or not a conservational basis could be identified, may be a distraction from a more imminent issue. What is really at stake in a rapidly changing world is to what degree indigenous people’s claims to and control over local resources should be recognized and supported.

However, a major worry in Fiji today is that traditional CMT has eroded and this is largely due to the increase in population, utilization of modern fishing technologies (fishing power and movement), the development of the cash based economy resulting in commercial exploitation of resources (Hviding, 1994), breakdown of chiefly authorities (Johannes, 1978; Crocombe, 1994), loss of traditional knowledge and most importantly, the adoption of Western ideologies. These modern ideologies have led to the failure, over the years, on the part of the government, implementing agencies and communities around Fiji, to recognize the potentials and abilities of the CMT system in achieving sustainable development and management of Fiji’s marine resources. More often, the belief is that a pure scientific approach is the better way of achieving effective development and management of marine resources. Further discussion on this theme is given later in this chapter.

MARINE RESOURCES MANAGEMENT EXPERIENCES

Traditional Management Systems

Hornel (1940:5) observed that:

The people who by right and heritage, by location and by prediction, should be the backbone of the fishing industry are the native Fijians. They have the aptitude, the knowledge of fishing grounds and the physical strength which go to the making of the perfect fisherman, but lack the driving power. They live for today alone. If they can catch enough fish for their immediate wants, or on occasion, a great haul to provide one of the main items in a gargantuan feast, they are well content.

The above statement shows how the effects of fishing activities of Fijian communities in the past were minimal. These trends, like other traditional practices that are discussed below, ensure the availability of resources throughout the year.

Traditional Fijian societies invented some management measures that contemporary institutions try to utilize for the management of marine resources in Fiji today. Examples include limited entry, closed seasons, periodic closed areas, size limits, gear restrictions and the protection of spawning aggregation sites (Johannes, 1978 and 1981). The objectives of these traditional practices are still debatable. Diamond (1986) dismissed the concept that traditional societies practice sustainable fishing practices, however, some of the traditional activities practiced met modern day management goals. Many of his examples concerned Pacific Islands. The use of derris root in Fiji is an example of unsustainable fishing method practiced in traditional day. On the other hand, the use of *tabu* in traditional societies is now regarded as having management effect. Johannes (2002) agreed with Diamond and stressed that some of the traditional fishing practices meet modern day management goals. In his article “Did indigenous conservation ethics exist?” Johannes (2002:4) wrote:

To be sure, Pacific Island fishers’ actions were not always ecologically wise. Their fishing taboos did not always have conservation as their objective, nor did their explicit conservation measures always work. But this does not negate the considerable and widespread evidence that various Pacific Island fishing cultures possessed a marine conservation ethic and put it into practice.

These traditional practices were means of stockpiling resources, often for a specific purpose such as feasts, funerals and chiefly functions and they were not intentional for maximizing and sustaining yields. The point to make is that even though these traditional practices were not intentional for management of the fish resources, somehow they have had conservation effects on the marine environment and its resources. Johannes (1978:354) mentioned that it is the Fijian peoples’ ways of life that ensures the sustainability of their resources by stating:

... their traditional customs and cultures developed mechanisms to control environmental destruction and maintain a harmonious relationship with nature.

One of the traditional Fijian methods for fisheries management was the existence of a system of periodic fishing closures, usually on inshore reefs, and this is normally referred to as a *tabu* (no-take areas). It involved the closure of fishing (the closure may not even apply to all species) on a particular section of the *i qoliqoli* for a

specific period of time, usually from a few months to a year or in some cases a few years, and might be publicized by the erection of sticks along the *tabu* boundaries. The closure was often associated with the death of a chief within the clan that owns that *i kanakana* and was a ceremonial component of a cycle of feasting associated with that death. In some parts of Fiji, for instance Verata, *tabu* and other traditional practices are still strongly practiced on the death of a chief (Tawake, 2003). An influential member of the clan, the *matanivanua* or *tunidau*, often announced the closure, and it could often include the declaration of a conditional spell or curse by the *bete*. The rationale for this was that if somebody violates the closure by fishing before the *tabu* is lifted, he risks getting sick or falling victim to sorcery-induced misfortune that might involve severe injury or death.

The level of respect for a *tabu* can; therefore, often be attributed to the reputed magical powers or sorcery expertise of the person who made the conditional spell. In contemporary Fijian societies, the *i talatala* (church minister) or other church leaders replaces the *bete* when the blessing ceremony of a closure takes place. The principle behind the usage of a church leader is similar to the one mentioned regarding traditional societies closures, however, the institutions are different. People in contemporary Fijian societies believe that they are not subject to sorcery induced spells but follow decisions due to their reverence for God, as mentioned by religious leaders when closure blessings are done. The chief, however, is often seen to have significant *mana*, or spiritual power, which is still a factor in people's willingness to comply with a *tabu*, whether it is traditional or modern.

However, the value of the *tabu* in traditional communities as a management tool for fisheries in contemporary societies has significant limitations (White and Wells, 1995), despite it being advocated as the ideal management tool in Fiji. The problem with this practice is that the closures are almost always opened again, usually after less than a year, and the accumulated stocks are then removed, often with alarming efficiency (Foale and Day, 1997). If fishing pressure is high, stocks of most fished species can be severely depleted very rapidly, despite the use of periodic closures using the *tabu* institution. Long-lived species are more disadvantaged than short-lived ones,

since their populations take longer to recover. If the typical length of a *tabu* is a year or less, then most species of invertebrates and reef fish are vulnerable to overfishing. If the majority of customarily owned reefs in a given region are over-harvested, then rates of recruitment will gradually slow down over time, and fishery productivity will decline. For this reason, non-permanent closures such as the *tabu* system cannot be relied upon to prevent depletion and the inevitable recruitment failure of subsistence and commercial fisheries in Fiji.

Another traditional control to overexploitation of the marine resources that needs to be discussed is totemism, which is the prohibition of the consumption of a certain fish or marine products, which have traditional, spiritual or ancestral value, by a group of people. These totemic organisms are regarded as sacred to members of a particular group which can be a clan, a family or the whole village. The belief is that killing or eating of these species by a member of the group may bring misfortune to the person and even to immediate relatives. However, this tradition only controls the exploitation of a particular species by a small group and therefore, does not guarantee effective management because other groups within that village and the neighboring villages are able to kill these totem species.

Traditional management systems alone in modern Fiji are not able to withstand the transition to a market economy and also are incapable of managing marine resources effectively. This opinion is supported by the lack of adherence to traditional management systems on most *i qoliqoli*, especially, the ones close to peri-urban and urban areas (Jennings and Polunin, 1996). Many people in communities feel they have individual rights to conduct things as they wish and not follow customary restrictions; others may do so out of economic necessity. Today, traditional resource management has eroded, due to factors such as increased production ideology, increase demand for cash, advancement in fishing technologies and lack of information to base management strategies (Fong, 1994) and especially, the erosion of traditional Fijian social lifestyle.

Centralized Management

Since the colonial rule, fisheries management in Fiji has been guided by the Fiji Fisheries Act of 1942. Under the Fisheries Act, fisheries management is the responsibility of the national government. The management measures (mainly through regulatory instruments) undertaken by the government throughout this time have generally been ineffective in promoting the sustainable development and management of Fiji's marine environment and its resources (Veitayaki, 1998). However, over the years the government has passed several other legal instruments and developed policies that encourage a "bottom up" approach, in the hope of controlling and managing inshore fisheries effectively.

All these legal documents and policies are thorough and are excellent tools for environment management; however, given the resources available in the institutions concerned and the socio-political settings of Fijian communities, this approach will not be successful in the sustainable management of the marine environment. Existing laws that govern and manage marine resources in Fiji include the State Lands Act which control the littoral zone, foreshore and submerged sea floor; the Marine Spaces Act 1977 (Cap 158 A) which is responsible for the management of fisheries within Fiji's EEZ; Fisheries Act 1941 (Cap 158) which prohibits the use of dynamite and acknowledges the rights of customary owners by endorsing the issue of fishing licenses; and the Fisheries Regulations 1965 which prohibits certain areas for fishing and some destructive fishing methods. The Environmental Management Act 2005 which is the latest legislation to be passed in Fiji looks at environmental management and sustainable development in a more holistic manner.

Fiji Fisheries Act

The Fisheries Act of 1941 arose out of fisheries ordinances put in place in the 1880s, with various additions over the years. The main intention behind the original fisheries legislation was apparently to protect rural Fijian's rights to maintain the people's subsistence livelihood, and to give a measure of basic protection to stocks of finfish and shellfish. In later years provisions for the licensing of fishing vessels were added. This was done partly to formalize the traditional system of fishermen seeking permission or *kerekere vakavanua* to fish in customary fishing grounds, and caters for

outsiders, and partly to enable Government to count the actual number of commercial fishermen. License to fish in customary fishing rights areas are only issued to fishermen who have already obtained a permit from the head of the relevant ownership unit (South and Veitayaki, 1998).

The issuing of licenses is an important strategy in the management of marine resources because those issuing licenses can choose to maintain a certain number of fishermen that can fish at a sustainable level. Other management tools in the Fisheries Act include the prohibition on taking fish by the use of dynamite or other explosive substances except with the approval of the Minister concerned. The Fisheries regulations contain more comprehensive provisions relating to prohibited fishing methods and areas. Certain areas are closed to fishing and mesh size limitations are in force for different types of nets and fishing fences. There are minimum size limits for 19 species of fish, crabs, turtles, trochus and blacklip pearl shell. There are absolute prohibitions on the harvesting of high market value and endangered marine species products such as dolphins, turtle flesh, giant clam flesh, triton and giant helmet shell and raw turtle shell (Adams, 1989). CBM initiatives work best when there is some form of legal recognition of the roles of the local people in regulating activities in their fishing ground. The Fisheries Act secures the rights of the Fijian people to make decisions on activities, whether for harvesting or management of marine resources in their *i qoliqoli*, even though they do not have the ownership rights.

Fiji Marine Spaces Act

The Marine Spaces Act provides for the demarcation, rights and regulations of Fiji's Marine Spaces. Cap. 158A of the Act establishes the archipelagic waters of Fiji and the twelve nautical mile territorial sea together with a 200 nautical mile EEZ over which Fiji has sovereign rights for the purposes of exploring and exploiting, conserving and managing the natural resources of the seabed, subsoil and superjacent waters. The Act takes over from the Fisheries Act all regulation of Foreign Fishing Vessels and is designed to control foreign and industrial fish harvesters. It states that any vessel that is not a Fiji Fishing Vessel must be licensed under, and abide by the provisions in the Act. It is much stricter than the Fisheries Act in its provisions and mandates much higher penalties for illegal fishing. However, from the point of view of maintaining a

sustainable resource, a fishery like beche-de-mer collecting or commercial spearfishing, or turtle netting actually needs tighter control than tuna longlining, since the resource is far more vulnerable to overfishing.

In the late 1980s, one of the main worries of concerned institutions was that the Fisheries Act was inadequate to control the possible harmful effects of the new wave of export fisheries developed by Fiji citizens and joint ventures, and that it needed to incorporate some of the ideas contained in the Marine Spaces Act. Over the years, the Marine Spaces Act has not been very effective in curbing illegal activities in Fiji's EEZ and this is largely attributed to the lack of resources to carry out the task of monitoring these activities.

Fiji Environmental Management Act (EMA)

The EMA was passed in Fiji Parliament in April, 2005 to deal with the management of the marine ecosystem and its resources, and the environment as a whole. It establishes the legal and administrative mechanisms to achieve sustainable development in Fiji. The introduction of EMA is an improvement and replaces very primitive laws that relate to environmental protection and resource management in Fiji. It creates new legal frameworks and administrative mechanisms for environmental impact assessments, wildlife conservation and national parks management, pollution and waste management, and integrated natural resource management. The integration of all the above aspects of sustainable resource management is made possible by the inclusion of a number of international treaties and agreements in the area of sustainable development, environmental protection and resource management, to which Fiji is a party. This includes most that have already discussed in the previous chapter (Singh, 1999).

The legislation is however, lengthy, intricate and resource-intensive for it creates a very detailed umbrella for government institutions and the community to work within. Hence, the implementation of provisions and monitoring of activities related to sustainable development is a huge task for all concerned institutions in Fiji. For instance, it ambitiously requires the completion of a Natural Resource Inventory as a basis for a National Resource Management Plan and this applies to the fisheries sector

also. The Plan is to provide the basis for determining the ‘carrying capacity’ of Fiji’s marine resources and ensure sustainable development of those resources. There must be an implementation programme. All activities connected with management must be undertaken in accordance with the Plan. Sustainable development policies developed by government agencies are to be compatible with the Plan. Every development proposal that will cause a significant environmental or resource management impact is subject to environmental assessment. Each assessment report must include a management plan and a monitoring programme. Regular environmental audit reports must be submitted, showing the extent of compliance with a Code.

However, an excellent feature of this new law is the establishment of mechanisms for meaningful community participation in all aspects of environmental and resource management. The legislation, like the Fisheries Act, also recognizes the roles of the local people in the management of resources. However, the problem is that, plan-making is purely a national, ‘top-down’ approach, rather than a partnership one, where active engagement in the plan-making process also takes place at the local community level. This does not encourage local ownership of the activities mentioned in the legislation and therefore, implementation may be hard to achieve, as is the case with past legislations concerning resources management.

Summary of Centralized Management

In the face of increased fishing pressure in Fiji, one of the solutions is to adopt western or centralized fisheries management methods and disregard other approaches. However, a drawback with this is that implementing this approach requires enormous human expertise and economic resources. For instance, scientific methods require knowledge of the biology of target species and the availability of catch and effort data. But, except in a few cases, the data required for scientific fisheries management for inshore waters in Fiji are not available. Much time-consuming and expensive research is required before Western-style management can be effected widely. From a management perspective it is unlikely that Fiji reef fisheries recruitment processes will ever be sufficiently understood to be incorporated into management initiatives. Centralized management in the form of legislations fails to recognize traditional laws and regulations or the socio-political settings of communities in Fiji, and this makes

them very hard to implement. Also, punishment in the form of fines and jail sentences for violating fisheries regulations is not always a priority for the courts.

The effective management task is made more difficult by the archipelagic nature of Fiji with islands scattered over great distances, making it hard to monitor illegal activities. Also, as is the case in most of the developing world, national budget constraints hinder (Farrow, 1996) the Fiji government's ability to allocate the necessary resources for the Department of Fisheries to carry out resource management. The effective implementation of centralized management strategies would increase the monitoring and regulatory responsibilities of the understaffed and underfunded Department of Fisheries of Fiji and other concerned institutions.

COMMUNITY-BASED MANAGEMENT IN FIJI

Given the pressing need for effective management of inshore fisheries and the scarcity of resources in Fiji, alternative management models have been proposed by fisheries experts over the years to strengthen, rather than weaken, the traditional approach (MRAG, 1999b). In reviving or mainstreaming traditional practices into a contemporary approach, local knowledge will substitute or complement scientific data while local planning will substitute or complements Fisheries Department planning phase. While Ledua *et al.* (1996) found that 40% of respondents in a coastal survey were not familiar with national rules for management of coastal resources, he suggested that this would have been effective if they were made simple and were seen to be relevant to the communities' needs.

Until recently, resource management activities in Fiji determined by government and based on legislations have been relied on to protect and rehabilitate the fisheries. The lack of success with these contemporary management activities and the desire to better utilize finite fisheries resources has resulted in the decision to change the resource management approach (Veitayaki, 2001). Consequently, community-based resource management arrangements have been adopted (Hviding and Jul-Larsen, 1995; Veitayaki *et al.* 2002).

The CBM approach may provide a strong basis for effective coastal management programs. In recent years it has been shown that this approach can handle changes (Jennings and Polunin, 1996) such as the increase in commercial operations; technological sophistication; and stressed and depleted marine ecosystems that are now experienced in many coastal communities (Veitayaki, 1998). However, Johannes *et al.* (1993) have noted that although effective contemporary management of inshore fisheries based on the CBM concept may be feasible, greater efforts are needed to devise ways in which it can be made to work in a modern, more cash-oriented context (World Bank, 2000) such as in the case in Fiji.

Community-based marine resource management is argued by researchers, writers and conservationists as the best approach to modern fisheries management (Tawake *et al.* 2001) in Fiji due to the institutional arrangement of the fishing ground and the social settings of the Fijian community. Therefore, understanding these socio-political settings of Fijian communities and institutional arrangement in Fiji is vital if this approach is to be effective and successful in managing Fiji's stressed inshore fisheries.

Fijian Social Capital as Catalyst to CBM Success

Social capital in this context means the norms and social relations embedded in the social structure of the Fijian people that enable them to coordinate actions in order to achieve desired aspirations. The existing social capital of Fijian communities is rooted in the people's cultural tradition and it has influence their motivations and their acceptance of management regimes today. It is important to recognize that such tradition is not something fixed but rather as mentioned by Beltran (2000:13):

... tradition as it exists in this rapidly changing world of indigenous peoples is a system of knowledge and rules which has strong roots in local history and experience but which is unwritten and disorganized.

The changing nature of traditions allows for flexibility in adapting to the changing social, political and ecological circumstances of contemporary Fijian communities. Over the years, most of the traditional Fijian ways of life have undergone transition to suit the lifestyle in this modern era. Hence, for CBM initiatives to be effectively implemented in Fiji, the social organization of Fijian communities or their

way of life in general, especially how changing values and monetization modify traditional resource use patterns (Johannes *et al.* 1993), must be first learned and understood because this can be a catalyst or deterrent to community initiatives. Important Fijian social capital areas to be looked at include the concepts involved in the term *vanua*, the social structure and chiefly authority system, and the social values or idea of perfect behavior of Fijian people, including the act of being considerate, embraced by the term *veinanumi*, the importance of the group over individuals and humble respect to authority.

The *Vanua* Concept

The basic unit of Fijian societies is the *Vanua* and members of this unit claim descent from a legendary founder (Derrick, 1946). According to Ravuvu (1983), the *Vanua* encompasses the totality of a Fijian community including the social and physical environments, and the supernatural world; in effect all the elements which make life occur. In his book, Ravuvu (1983:31-32) gave a very detail account of the characteristics behind the concept of *Vanua*. He wrote that:

The term *Vanua* has physical, social and cultural dimensions, all interrelated. It means not only the land areas with which the people are identified, but also the social and cultural systems- the people, their traditions, customs, beliefs and values, together with other institutions established to achieve harmony, solidarity and prosperity...

The *Vanua* contains the actualities of the people's past and present, and the potentialities of their future. It is an extension of the concept of the individual self, the group self..

Vanua literally means land, but also refers to the social and cultural aspects of the environment. On the social plane it includes the people and how they are socially structured and related to one another. On the cultural plane it embodies the values, beliefs and common ways of doing things....

The *Vanua* is also the (*tamata*) people or *lewenivanua* (flesh of the land or contents of the land) by which a particular *Vanua* (land in its physical and social entities) is known to other social groups. The people are the human or social identities of the land, and the means by which the land resources are exploited and protected for the benefits of the *Vanua*, the people and their customs...

The land and water areas belonging to a *Vanua* (tribe) or *yavusa* (clan) are generally of four main classes. They are the *qele ni teitei* (gardening land), the *veikau* (forest land), the *yavutu* (founding ancestors' house sites) and the *i qoliqoli* (fishing area).

Regarding the *i qoliqoli* as an element of the *Vanua*, Ravuvu (1983:32) noted that it was, and still is to a certain extent, vested in the community;

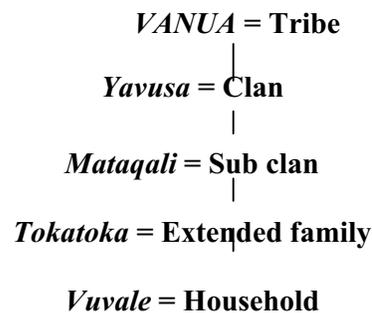
It included all rivers, creeks, lakes and stretches of sea that a particular *Vanua*, or its component *yavusa* and *mataqali*, claimed as their traditional fishing grounds. Although other classes of land have been registered under the *mataqali*, the *i qoliqoli* is still open to the wider community of related kinsmen to exploit as their most important source of protein food.

In the above context, it can be noted that to Fijians, the sea or fishing ground (*i qoliqoli*) is thought of as being an extension of the land. Hence, to Fijians, the *Vanua* encompasses land areas, freshwater, shorelines, offshore reefs (mainly to the fringing or barrier reefs) and islands, and all the minerals and natural resources, and is embodied by the beliefs, customs and values of the people who live in it. In traditional Fijian societies, Durutalo (1997) noted that *vanua* often extended beyond boundaries and had flexibility in succession to its chiefly throne since it was determined mostly by chiefly conquests. However, the colonial era has stopped the flexibility of the *Vanua* and its kinship relations through the demarcation and codification of boundaries.

The Fijian Social Structure and Chiefly Authority

Traditional Fijian communities may be described as self-reliant and self-sufficient village societies rich in culture and values, with varying forms of social structure. However, they were fitted into a simplified social structure in the beginning of the 1890s through the work of the Native Fisheries Commission and this was based on certain principles extracted from the patterns that exist in Bau (Fong, 1994), since it was the dominant tribe at that time throughout the Fiji group. The official structural organization is represented diagrammatically in this form.

Figure 4.3: The official Fijian social structure



Source: Fong, 1994

The *vuvale* is the smallest unit in the Fijian social structure and it mainly comprises a man and his spouse together with their children. The members of a *i tokatoka* are very closely related and always include those households within an extended family. The *mataqali* is the liaison agent in the Fijian social structure because its major role is relaying decisions to *tokatoka* under its leadership on decisions made from the top level in the structure. The *mataqali* comprises various *tokatoka* which have blood links and it is at this level of the structure that special tasks are assigned to each unit. For instance, the *mataqali turaga* is the one that is responsible for the leadership role in a *yavusa* and the *mataqali matanivanua* is the spokesman of the chief and is responsible for relaying messages to and from the chief through the proper social channel of communication. The *yavusa* is characterized by the different *mataqali* it encompasses and usually it is the unit whereby the Fijians establish their *yavutu* (village). The *vanua* in the Fijian social structure comprises different *yavusa*, which in most cases are not linked through blood ties but through their allegiance to a revered warlord. Therefore, in the Fijian social system, the *yavusa*, the *mataqali*, the *i tokatoka* and the *vuvale* to which this warlord belongs is the most respected and paramount in the whole *vanua*. Another point to make is that in each unit, there is always a leader and in the case of the *i tokatoka* and *mataqali* it's usually the family of the eldest son; however, the power of these leaders is restricted to that unit.

Fijian societies are patrilineal and hierarchical in structure. Tuitoga (2003:40) wrote that in a Fijian society:

“Each social unit in the hierarchy has a fixed position and there is a known order of seniority which is applied both within social groups and between them. The position of a social unit in a particular hierarchy is known and carries specific functions and responsibilities. The roles operate vertically within the hierarchy and laterally between hierarchies”.

Lasaqa (1984) mentioned that each unit has certain traditional ties and duties with which it is identified and distinguished from other groups, so its duties are performed to maintain the chiefs but also to ensure the continuation of communal living (Tuitoga, 2003). Traditional leadership in the form of a chief is central to Fijian societies and to decision making about the land and *i qoliqoli* and the *Vanua* as a whole. Nayacakalou (1975:10) describes the chiefly system as:

A Fijian chief is, most importantly, a member of the lineage in which he occupies a position of authority primarily through his relative seniority in terms of descent... His lineage is the leading one in his village and the village may be recognized as superordinate over other villages. It is through this superordination of groups – of a lineage over other lineages, of a village over other villages – that customary rights to the exercise of authority are conferred.

The chief has the authority and power to make decisions on behalf of members of the society. However, this does not usually happen in traditional societies, because chiefs have consultants that specialize in different areas from whom they often seek advice regarding issues that concern their people and the *Vanua* as a whole. For instance, the Roko Tui Bau (chiefly title in Bau) always present *i yau* (gifts in the form of *tabua* (whale's tooth), *ibe* (mat), *yaqona* or other traditional items of value) to the *Tunidau* (chief of fishermen or *turaga ni mataqali gonedau*) whenever turtles for a ceremony are needed. The *Tunidau* then presents these gifts to his people, the people of Lasakau who were the *Gonedaus* of the RokoTui Bau. It was the *Gonedau* who undertook all fishing activities, whereas the *Tunidau* acted as a liaison officer between the chief and the actual fishermen (*gonedau*).

The village headman looks after administrative matters of a village, with the advice of the chiefs or the village council. The decisions made by the chief and his advisors are always known to all members of the community through the chief's *Matanivanua* (spokesman or official herald), village headman or other traditional mode of communication. Enforcement in traditional societies was not necessarily needed as people were bound by decisions given and social agreement to an issue (Siwatibau, 1984). However, in modern Fijian societies where this system is no longer practiced and individualism is common, chiefly decisions are not always followed. This concern is one of the root causes of the breakdown of social systems in villages around Fiji today.

In recent times, the roles of chiefs in Fiji have been debated and their legitimacy is often questioned. This is largely due to the benefits that come from holding this title, such as respect and money. If a chief neglects elements that bond a *Vanua*, this leads to less respect and his credibility will often be questioned by his people. Other factors that

have contributed to the undermining of chiefly status are the result of the introduction of Western ways of thinking to this traditional setting. Also, many chiefs neglect proper social channels of communication; consultations and decisions are made without the awareness and knowledge of concerned institutions. Improper actions of some of the chiefs, for instance, in disputing titles, also undermine their credibility and status. It has been suggested that these disputes happen not because people want to lead the *Vanua* and its people to ensure prosperity but because of the benefits of holding this title, such as income from land leased to outsiders. To the commoners, such behavior indicates greediness of their leaders; hence, their decisions may not carry as much authority. Also, Western ideologies such as human rights demand citizens of a country to be treated equally, without the superiority of a particular group, and this contradicts the Fijian chiefly system and the Fijian social lifestyle.

Fijian Social Relations

The people's relations in Fijian communities are not confined within their village or *Vanua*. These relations go beyond to other *Vanuas* to which they pay allegiance with, or which they have blood ties with. Veitayaki (2002:5) mentioned that:

A fascinating feature of the Fijian social system was the fact that people were related to everybody. In many cases, people were related to one another because of where they were from and not because they knew each other.

The attitude of *veinanumi*, the act of being considerate in Fijian communities, guarantees that nobody feels ignored in the village and it also ensures that resources are efficiently used and not wasted. With this attitude, villagers feel obliged to assist fellow villagers with chores that need manpower and time, without any monetary reward. Financial rewards gained from such activities are a lesser consideration because of the knowledge that there will be a time when one will need the support of others. Nayacakalou (1975:23) stated that in Fijian communities one "... has obligations to one's own group; and one is involved in the obligations of one's group to other groups".

Also, in Fijian societies, the principle that one should know and recognize all people and establish kinship or other social links with them is an essential element of

the Fijian value system which allows a visitor to be accommodated with little stress. This is made a lot easier when the visitor makes a presentation of *i sevusevu* (*yaqona* or traditional gifts) to the chief and village elders, to seek permission to stay in a village. This practice enables practitioners and facilitators to be well accepted and accommodated in a community during the implementation of CBM initiatives.

IMPLEMENTING AGENCIES IN FIJI; Institutional Strengthening for CBM

Collaboration and partnership of the different institutions and stakeholders concerned with community resource management and development work, through the formation of a learning network, has been one of the cornerstones of success of CBM initiatives in Fiji. The Fiji Locally Managed Marine Areas (FLMMA) Network was established on 12 March, 2001. FLMMA is a network of institutions in Fiji that are focused on locally managed marine areas or marine reserves, and that are interested in sharing and collectively learning from one other. The establishment of the FLMMA network was based on a simple principle, that is, to develop better ties between NGOs and the government to better manage CBM projects to achieve the expected outcomes: improved resource management and local livelihoods. Some of the objectives of FLMMA as stated in its Constitution are to:

- encourage collaboration among government departments, non-government organizations and communities to better manage the "*i qoliqolis*" of Fiji
- encourage the use of adaptive management as a key to learning and achieving best practice
- realize the importance of participatory techniques in the empowerment of people and communities
- design and implement a plan to collect and analyze a comparable set of data to enable us to learn from each other's success and mistakes
- provide support and capacity building assistance to projects on an ongoing basis to collect this common data
- promote cross-site visits that incorporate specific skills training
- share logistical and technical information
- engage with other coastal resource management initiatives/portfolios
- hold on-site training workshops that target specific skills development
- create joint policy briefs and educational materials based on collective learning
- produce regular analyses and "stories" showing successes and failures with projects and the portfolio learning process
- identify and establish links with specific resource people at key institutions and communities
- engage in collective advocacy for locally-managed marine areas

The FLMMA network has helped bring together NGOs, governments and individuals to collectively seek effective solutions and ways to manage the vulnerable marine resources over the past few years. The identified organizations, government departments and institutions that are part of this learning network are:

- Institute of Applied Science (IAS) and Marine Studies Programme (MSP) at the University of the South Pacific (USP),
- Foundation for the People of the South Pacific- International (FSPI),
- World Wide Fund for Nature (WWF)- Fiji Program,
- Fisheries Department (Fiji Government),
- Fijian Affairs Board (FAB)
- Environment Department (Fiji Government)
- Ministry of Tourism (Fiji Government)
- Resort Support Fiji
- Native Land Trust Board (NLTB)
- National Trust of Fiji (Fiji Government)

Each of these organizations has project sites around Fiji, where they have worked with local communities to help them establish MPAs, to not only manage the marine biodiversity within these areas but to also sustain their livelihoods now and for future generations. The implementing organizations realized they did not possess all the skills and resources required to plan and manage programs as multi-faceted as these CBM initiatives. However, through networking, partnership and collaboration, FLMMA has been able to deliver a wide range of advice to communities regarding coastal management issues. Each partner has the capacity to discuss different issues. For instance, the FAB has the capacity to discuss issues related to the *bula vakavanua* (Fijian ways of life), while the Fisheries Department has the competence to talk about government's policies on fisheries development and management and IAS can deliver scientific advice to the people regarding marine ecology.

Also through this networking, partners are able to share cost of activities and information related to better practices. This approach does not only facilitate improvement to management strategies, but it also ensures that the objectives are clearer and the partners' resolution to succeed is reinforced.

FLMMA network partners are able to work harmoniously together because of their common vision that coastal resources management and local community

livelihoods can be improved through the development and implementation of effective management strategies. Effective strategies become known through sharing information on the site-specific problems, solutions and achievements of each project. The network operates on the basis of a social contract where partners have agreed to collaborate to improve resources for the communities involved and the marine environment. The social contract is not legally binding but demands that the members observe common values that emphasize good social relations among members. However, this sort of arrangement only works well in the short term because partners are not compelled by legal means but by free will and good faith to participate in activities of the network. Therefore, once a member is dissatisfied with an issue, there is no mechanism for conflict resolution that will improve dialogue. At the moment, FLMMA is experiencing such events, whereby dissatisfied members start to pull away from networking and partnership. Partnerships and collaborations are more likely to survive changes in leadership or institutional structure or any other matters if the relationships are based on formal memorandums of understanding and enforceable contracts.

CONCLUSION

In summary, the effective management of marine resources in Fiji is impossible without the active involvement of communities in all processes of the management. It can be noticed in this chapter that the communities are responsible for shaping the current state of the resources because they account for the majority of fishing in Fiji's internal waters. Also, the social and political settings of communities in Fiji provide a catalyst for effective resource management. Resource management strategies can be mainstreamed in existing social channels and means of communication. Fiji has all the elements for achieving effective marine resource management, however, the challenge is to successfully utilize these existing fundamentals.

Challenges such as gender issues, sustainable projects, sustainable financing, legal and political support need to be addressed by resource management institutions in order to ensure full effectiveness of projects not only on a short term basis, but to be rooted in the minds of this generation and the ones that are coming.

CHAPTER 5: CBM IN KOROLEVU-I-WAI DISTRICT, FIJI ISLANDS

INTRODUCTION

The case study of community-based management in the district of Korolevu-i-wai provides for the thorough analysis of this approach at the community level. Even though CBM is often regarded as simple and easy to be implemented compared to other focus of resource management, one should not disregard the complexity that is involved. Being rooted at the community level, the approach involves many stakeholders who are affected directly by whatever decisions are made. These stakeholders also have diverse social, economic, cultural and political backgrounds and varied degrees of influence in decision making. These elements all affect decisions that are made communally. Hence, the descriptions of Korolevu-i-wai district in this chapter situate the study site in its larger contexts. This is done through an examination of the histories, geographies, economy and social structure in the area. The chapter also discusses the implementation of the CBM project in the district. The factors that contributed to the achievement of the CBM project goals are also presented and discussed. This chapter is an evaluation of the social and economic impacts of the CBM project on the people in Korolevu-i-wai district. This chapter provides a lens through which the previous chapters can be best understood as it demonstrates the implementation of the theoretical framework discussed earlier. This chapter also provides the grounds for the next chapter, which lays out recommendations for the future.

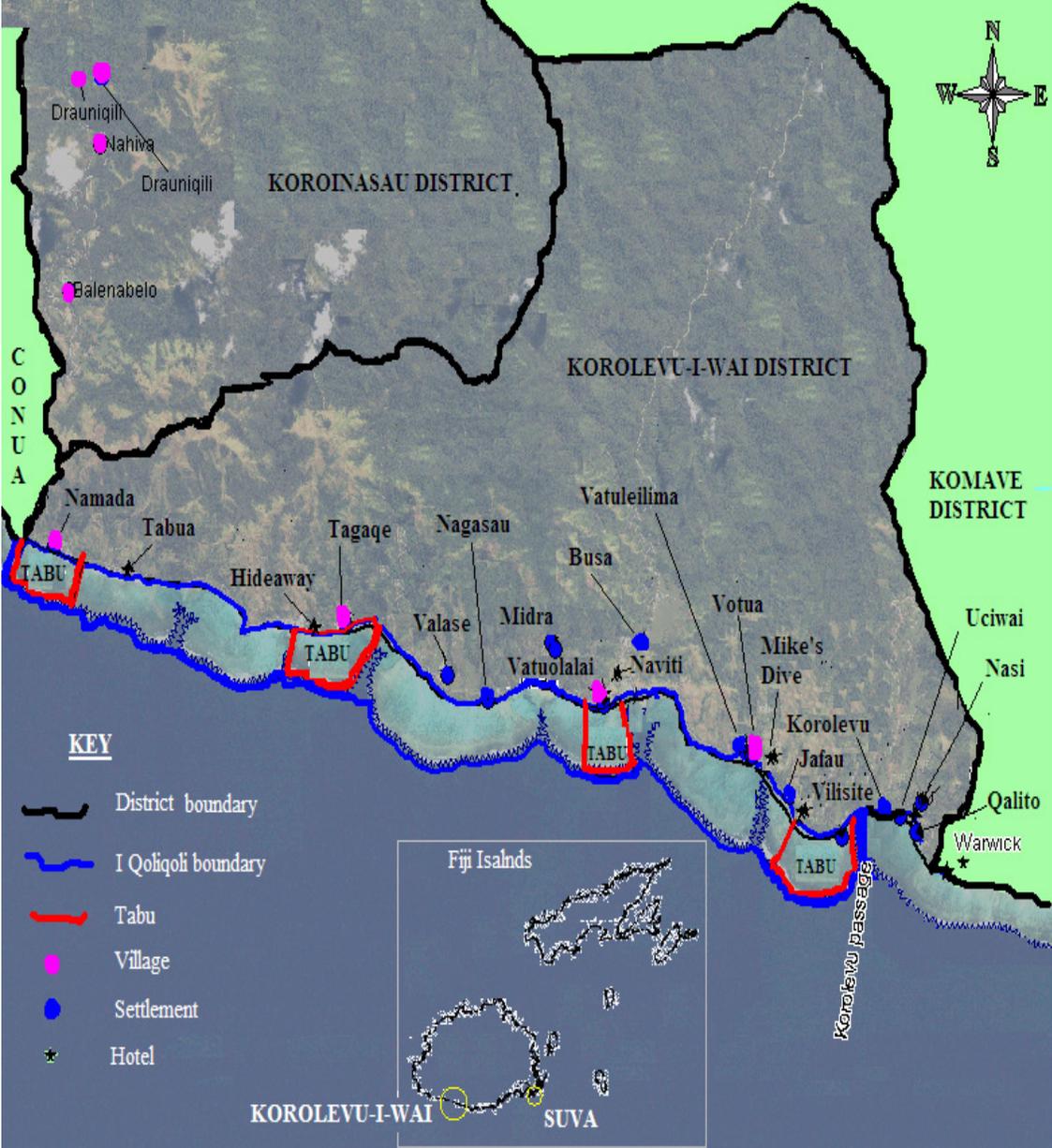
KEY FINDINGS

Korolevu-i-wai- A Brief Overview; Physical Geography and Population

Korolevu-i-wai district is located approximately 95km from Suva city on the southern coast of Viti Levu with its coastline forming part of the Coral Coast (Figure 5.1). It is in the province of Nadroga/Navosa and one of the smallest districts in Fiji. Korolevu-i-wai belongs to the *vanua* of Davutukia, which encompasses the four villages of Votua, Vatu-o-lalai, Tagaqe and Namada. Votua is the chiefly village of the district, where the Tui Davutukia i Wai resides. Over the years there has been establishment of settlements to cater for non-Korolevu-i-wai people who have moved into the area mainly to find work directly or indirectly in the tourism industry in the

district. These settlements include Qalito, Nasi, Uciwai, Jafau, Korolevu Settlement, Votua Housing, Vatu-o-lalai settlement and Nagasau.

Figure 5.1: Map of Fiji Islands showing the location of Korolevu-i-wai district



Source: Fiji Lands Department, 2003

The population of Korolevu-i-wai is approximately 2500 with an approximate household number of 350. It is one of the densely populated rural districts in Fiji taking into consideration the size of the land area and the number of people who dwell in it. The population in the district has changed substantially over the past thirty years.

People from different parts of Fiji were and are still drawn to the region, attracted to the increasing economic activity stemming from the tourism industry, with some taking up permanent residency in the area over the years. A number of recent settlers in the district are Indian farmers who have been able to secure pieces of land through native and crown land leases.

A Brief History

The district of Korolevu-i-wai has gone through a series of major changes in the past centuries. During the pre-colonial era, the *vanua* of Davutukia-i-wai was part of a large *vanua* known as Davutukia. Situated in the interior of Viti Levu, the main village was called Koroinahau. In the early 1800s, conflicts within this *vanua* regarding social status resulted in the division of members, with each of the three factions forming their own territories which were later recognized as separate *vanuas*, namely Koroinasau, Bemana and Korolevu-i-wai. This division resulted in the uncertainty of the social structure and obscure roles of the different social units in each faction. This also explains the sharing of the customary fishing rights area between the district of Koroinasau and Korolevu-i-wai which will be described later in the chapter.

In 1843, Christianity was introduced and accepted in the *vanua* of Korolevu-i-wai and in 1912 it was registered to the district of Baravi which also includes the *vanua* of Conua and Vusu. The mid-1900s saw the emergence of a series of development projects in the district with the Queens Highway constructed in 1946. The latter half of the 1900s saw the beginnings of the tourism industry. The Korolevu Hotel, the first hotel to be built in the district and in Fiji, started operating in 1960. Later, the Naviti and Hideaway hotels also started operating in the area (Tawake *et al.* 2003). The operation of these major hotels in the last decade has also led to the establishment of other tourism initiatives such as backpackers, ecotourism, dive centers and homestays. As the tourism industry developed over the years, increasing numbers of foreign travelers began journeying to the area. The Korolevu-i-wai District today does not only feature excellent touristic resources such as the coral reefs, white sandy beaches and clear oceanic views, the communities are in most respects richly endowed and more developed in terms of standard of living and infrastructure in comparison to other rural Fijian communities in Fiji.

The Customary Fishing Rights Area (CFRA)

The CFRA in Korolevu-i-wai is owned by the *Vanua* of Davutukia which comprises the *yavusa* Davutukia, Bolabola, Keasuganaqali and Kubunicere in the district of Koroinasau (see map) and the *yavusa* Davutukia, Kubunicere, Noi Tubai, Naculava and Wai in the district of Korolevu-i-wai. The CFRA starts from the high water mark at Muanidele Point and run straight to the center of Korolevu Passage, then goes westerly along the seaward edge of the fringing reef crossing Daveta reef, Votua reef, Vatu-o-lalai and Midra reef to a point opposite Bilanalenivotuvotu creek near Namada, then on a direction of 40 (M) to the mouth of the mentioned creek at the high water mark then easterly following the high water mark passing creeks and the four villages of Namada, Tagaqe, Vatu-o-lalai and Votua to the starting point of Muanidele point (Native Land and Fisheries Commission, 1994). The CFRA has an estimated total area of 71 km² of which 12 km² is being designated as fish reserve or “no take” zone, representing approximately 20% of the total CFRA. These four no fishing areas are located and managed by the four villages.

Social Organization

The social organization of the district of Korolevu-i-wai is summarized in Figure 5.2. The *yavusa* Davutukia is the key player in shaping the social structure of this *vanua*. Anecdotal history from elders described that the *yavusa* Davutukia arrived after all the other *yavusa* had settled in the area, and the *yavusa* took up the leadership role after conducting battles with the others. Under the NLC, the *yavusa* Naculava, Tubai and Wai are under the leadership of the *yavusa* Davutukia, even though they are of different origins and without any traditional blood ties or relations.

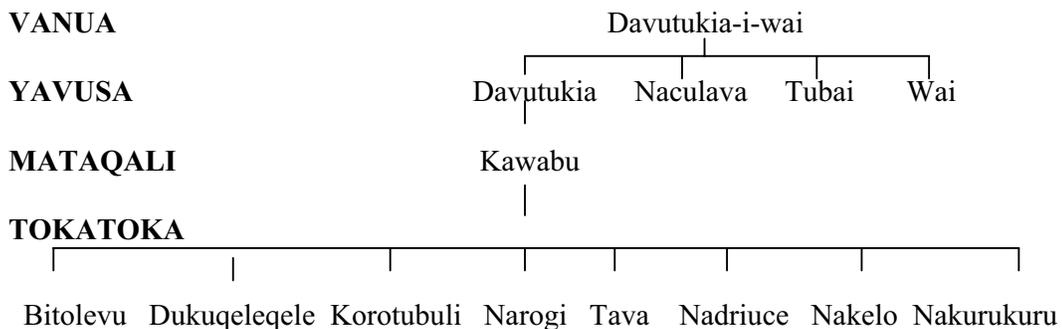


Figure 5.2: Social structure of the vanua Davutukia-i-wai

Today, the *tokatoka* Bitolevu holds the leadership role in the district of Korolevu-i-wai. The *tokatoka* Nadriuce is the *sau-turaga* in the district with the responsibility of ensuring the *i tikotiko vakaturaga* (chiefly ways) is maintained. The majority members of this *tokatoka* reside in the village of Namada. The *matanivanua* of the Tui Davutukia-i-wai are members of the *tokatoka* Narogi and most of them reside in Tagaqe village. The social structure of the *vanua* Davutukia-i-wai is one that is not well defined with the roles and responsibility of each *i tokatoka* being obscure. However, over the years the people have adapted well to the system and have managed to come up with strategies to tackle social issues. The later discussions of the results highlight some of the ways in which the people of Korolevu-i-wai address such issues.

The Tourism Industry

Although the Coral Coast is famous for its tourist features, the Korolevu-i-wai area is actually one of the most visited regions of the country and is accounted for approximately 27% of the total tourists yearly (Fiji Visitors Bureau, 2002). The development of Korolevu-i-wai's tourism industry has attracted both migrant workers from other parts of Fiji and tourists alike over the past thirty years and it has also led to the opening of vast numbers of businesses in the community. For instance, the Korolevu-i-wai area houses several organized village tours, dive excursions, horse riding, shop operators, gamefishing, handicraft centers and other money-making activities in which the villagers are a main beneficiary. Additionally, shops and restaurants have opened to meet the demands of workers in the industry and tourists. Examples of these community initiatives include Mike's Dive and Vilisite's Restaurant in Votua, horse riding and hair salon in Vatu-o-lalai, village tour in Nagasau Settlement and Korolevu Handicraft Center in Jafau Settlement. As will be presented in Chapter Five, the money brought to the community via the tourism industry contributes greatly to the social and economic development of the people in the district.

However, as tourism increases, so does the possibility of environmental degradation, as well as social, economic and cultural changes in the area. Evidence for such changes is readily apparent, as will be discussed later in the chapter. These changes are tempered by the protection of the rights of indigenous people to make decisions over their land and marine environment, as guided by certain laws of Fiji

which have been discussed in the CMT section in the previous chapter. The rights of indigenous Fijians are also always respected by foreign tourism operators. It was with these rights that the people of Korolevu-i-wai initiated the CBM project, with the vision of maintaining their natural environment for the betterment of their future generations, a view which aligns with the sustainable development concept, as already discussed in Chapter 2.

BACKGROUND OF THE CBM PROJECT

The CBM initiative started in the early 2002s. However, the interest of the people started when they noticed scarcity of the marine resources in their fishing ground and the change of water quality on their shores. This prompted some villagers to seek assistance from IAS to conduct water quality assessment in their fishing grounds to determine the cause of poor water quality they were experiencing. However, during this period, news of the success of a CBM project in Verata and nearby Cuvu were made known to the people. The people of Korolevu-i-wai were very interested to implement a similar project in their district to address the scarcity of marine resources. At the same time, one of the hotels in the district was interested in setting up a marine area for tourists to visit and to take part in the restoration of coral on the reef. Consequently, through a formal request to IAS from the Manager of Hideaway Resort expressing the hotel's interest together with that of the villagers of Tagaqe, the Institute started with consultation work for the district. The overall process of community interaction is given in Figure 5.2.

Consultation work done by IAS involved a meeting with Tagaqe elders and representatives from the Nadroga/Navosa Provincial Office and other government departments which was held in October, 2002. The goals and approaches followed by IAS were in line with what the community and the hotel expected, therefore, the date and venue for the management planning workshop was confirmed. Invitations for participation in the workshop were extended to the other villages and hotels in the district.

The Marine Resource Management Planning Workshop was held in Tagaqe Village in November, 2002. The workshop allowed the communities to identify issues that concerned their marine resources together with the actions that they could implement to solve the problems that affected their resources (see Appendix 5.1 for Korolevu-i-wai CBM project management plan). On the last day of the workshop, participants developed a resources management plan for the district. The details of management activities, the date of implementation of these activities and person and/or group of people responsible for the implementation of these activities were outlined in this management plan.

On the last day of the workshop, the Korolevu-i-wai Environment Committee was formed. The role of the Committee was to oversee the implementation of management actions mentioned in the management plan and also do overall administrative activities regarding the project in the district. About four months after the initial workshop, a Biological Monitoring Training Workshop was held in Tagaqe village. This workshop took place in March, 2003 and was attended by representatives from other villages and hotels in the district, mostly those who participated in the first workshop. The aim of this training was to encourage communities to assess the effectiveness of their management actions by monitoring changes in fish numbers and coral cover.

At this workshop, methods of assessing different marine ecosystems were discussed and participants were also given the opportunity to practice biological methods that they could use to monitor several resource health indicators. At the end of the workshop, a biological monitoring plan was developed with the hope of enabling the community to conduct monitoring activities in a systematic way. In the last three years, the people of Korolevu-i-wai with assistance from IAS have been collecting biological data from their MPAs and also from the harvest areas.

In May 2003, representatives from the Korolevu-i-wai project attended a Socio-economic Monitoring Training Workshop which was held in Muaivusu village which is part of the Yavusa Navukavu Project. Participants were trained to conduct social and economic monitoring in their projects. In this workshop, participants were shown how

to conduct data collection of social and economic factors in a questionnaire format and they agreed on traditionally accepted protocols for conducting household and key informant interviews and other social and economic information survey methods.

In June 2003, a social and economic baseline data collection was done in the four villages in the district. With the assistance from IAS staff, the monitors in Korolevu-i-wai were able to finish this task in two days. At present, there has been no follow-up survey conducted in the district. However, during the data collection in the area for this study, I tried to follow-up on some of the topics covered in the baseline survey.

An emerging issue that the people of Korolevu-i-wai encountered after the implementation of some of the management actions was the increase in poaching in the managed areas, hence, a Fish Warden Training Workshop convened by the Fisheries Extension Office in Sigatoka was conducted in Tagaqe village. All villages in the district were represented in this training.

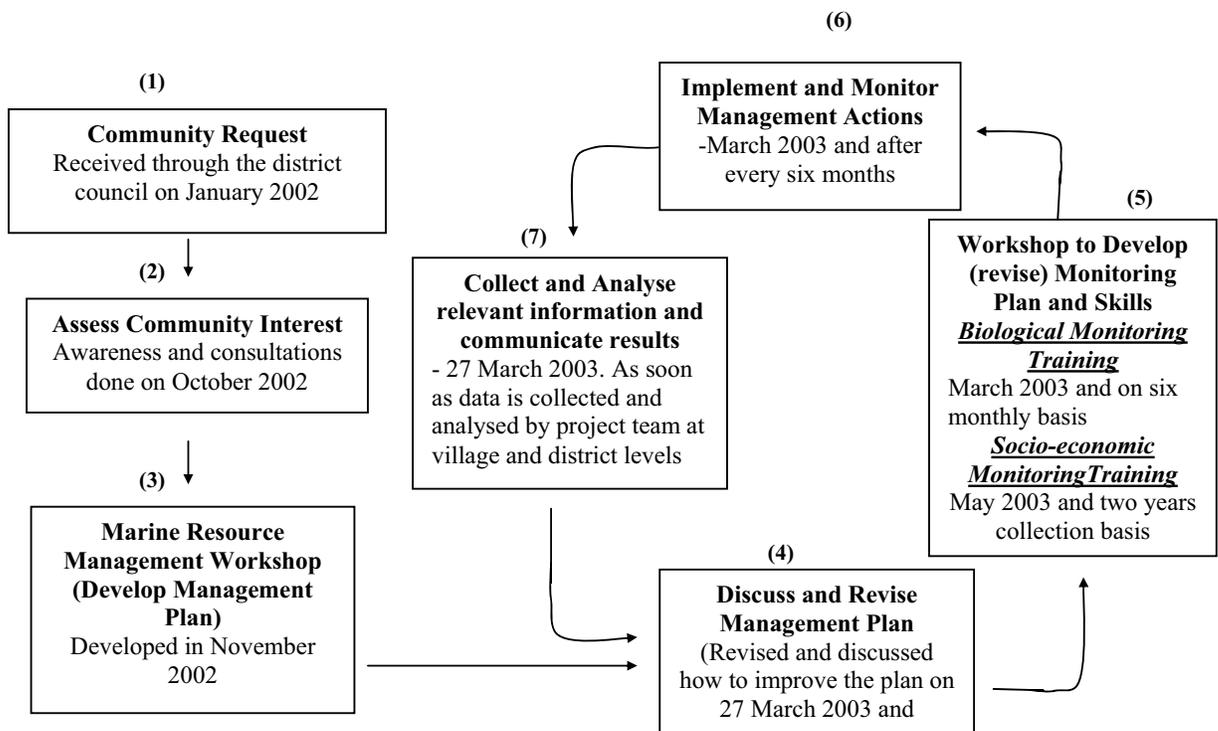


Figure 5.3: The Korolevu-i-wai CBM project engagement process

THE SOCIAL AND ECONOMIC ENABLING FACTORS FOR THE CBM PROJECT

The factors that are tested and discussed below were drawn from the list that the respondents highlighted during the first survey conducted in the district. After collating these factors, the questionnaire was then refined in order to examine these factors in detail during successive field data collection trips in the district.

POPULATION FACTORS

General household characteristics

A total of 109 households were surveyed. The average household size is approximately 7.3 persons, ranging between 2-11 persons in a single household. Considering the age composition (see Figure 5.4) of household members, most of the members (46%) are in the working group of 22-55 years, followed by younger members (22%) belonging to the teenage age-range group, that is, 12-21 years of age. The third group (19%) belongs to the infant and primary school age-range group (0-11 years) while the rest (13%) constitutes elderly members above 55 years of age. Overall the age of household members in the district covered a range from 0 to 83 years.

It can be described that the population in Korolevu-i-wai is very youthful, with 61% of the population being from 1-35 years. The effective management of resources in this area is very critical for the sustainable livelihood for the people, especially for the coming generations.

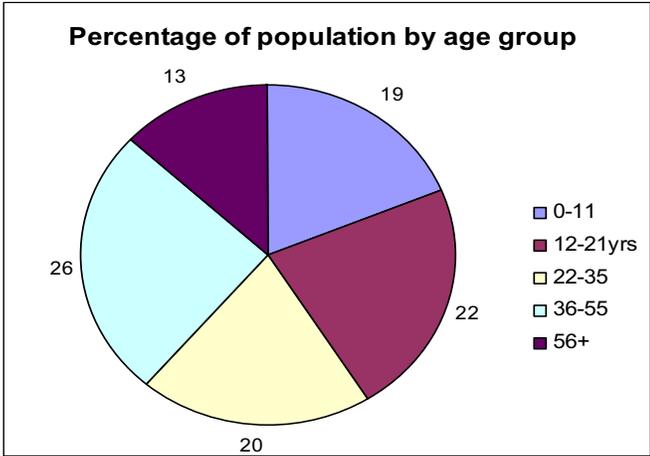


Figure 5.4: Age composition of household members in Korolevu-i-wai

Education level

Considering members who start their primary education at age 6 in the Fiji educational system, about 34% are still undertaking or have obtained primary education only. About 48% have either obtained or are still undertaking secondary education and 13% have obtained vocational or tertiary education, whereas about 3% of members of the working age-range group between 23-62 years old do not have any formal education. The average years of education for male and female working group members are 11.5 and 10.9 respectively, ranging from 0-15.9 years (male) and 0-15 years (female). The overall educational attainment of household members in Korolevu-i-wai district is high in comparison to other places in Fiji.

Population diversity

The population in Korolevu-i-wai is very diverse taking into consideration the different age groups (as already discussed), church denominations and the places of origin of the people in the district. For the place of origin (Figure 5.5), just over half (54%) of the population are legally registered as the people of Davutukia-i-wai, while the other half (46%) constitute mainly residents from the province of Nadroga and other parts of Fiji. About 14% of the total population are from Lau and they mainly reside in four of the eight settlements in the district, namely Nagasau, Jafau, Nasi and Uciwai.

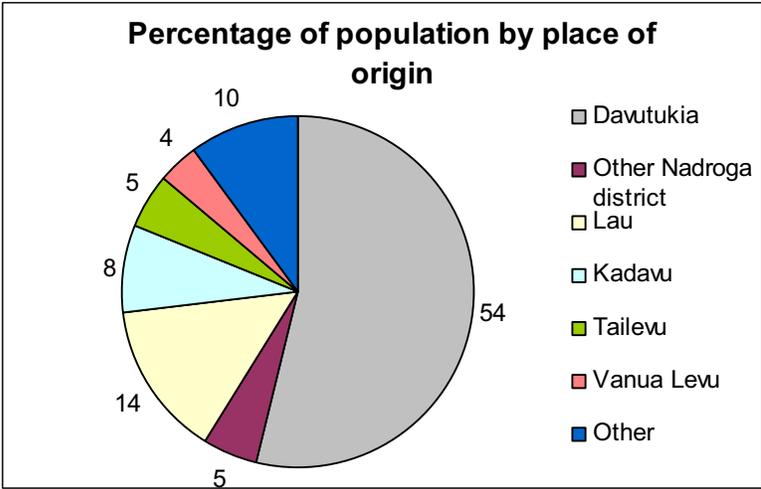


Figure 5.5: Place of origin composition of residents in Korolevu-i-wai

Overall, there are a total of 10 church denominations in the district of Korolevu-i-wai with the majority (45%) being Methodist, followed by Catholic (12%) and Assemblies of God (11%). The other denominations constitute the remainder of the population as shown in Figure 5.6. Even though the teachings in the different denomination are similar, the practice and the values in each group are different from the others; therefore, this may pose a barrier to achieve full consensus on decisions made. For instance, most of the people interviewed who belong to the “old” denominations feel it is their responsibility to manage marine resources for their future generations, whereas, some respondents from the “new” Pentecostal denominations stated that it is not their responsibility to manage the marine resources because the necessitates for future generations will be provided automatically as in the case for past and present generations.

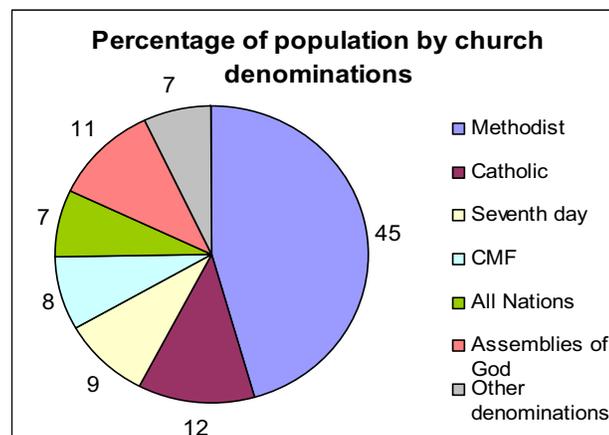


Figure 5.6: Church denominations of residents in Korolevu-i-wai

The Locally Managed Marine Areas Network (2003) assumption is that it will be difficult to maintain a successful project when there is high human population diversity due to the high degree of complexity of governance that exists. However, in the case in Korolevu-i-wai where there is a very wide array of population diversity, the high diversity of population does not affect the CBM project because in decision making regarding the *i qoliqoli*, the forum that makes these decisions consists of a homogenous group which are the people of Davutukia and registered owner of the CFRAs in the district.

ECONOMIC FACTORS

Economic condition

Household classification based on house structure and building materials and ownership of durable assets was used for classifying the economic status of households in the district. The result of households' classification based on structure and building material is presented in Table 5.1. The majority of households (about 39%) can be categorized as the high group, 31% as medium, and 18% as low while the remaining 7% and 5% belong to the very high and minimal groups respectively.

Table 5.1: Household house classification based on building materials and house structure (2004)

Category	% of Households
1. Minimal (made of light materials eg. bure)	5
2. Low (made of light material plus wood or lumber)	18
3. Medium (combination of wood and iron roofing)	31
4. High (made of concrete and galvanized roof)	39
5. Very high (made of concrete, wood ceramic roof of good quality)	7

The measurement of household ownership of durable assets was done by scoring each type of durable asset identified and then accumulating them into the total score. Durable assets identified include radio, television, tape recorder and cassette player, refrigerator, cooking stove (gas or electric), sewing machine, washing machine and others (e.g., microwave, electric fan). The results are presented in Table 5.2, and based on the findings, the majority of households (about 51%) can be categorized as average, with 20% as slightly rich and 16% as slightly poor while the remaining 9% and 4% belonging to the rich and poor groups respectively.

Table 5.2: Household economic status classification based on ownership of durable assets

Category (score)	% of Households
Poor (< 3)	4
Slightly poor (3-5)	16
Average (6-8)	51
Slightly rich (9-10)	20
Rich (>10)	9

There is generally great variation in the average monthly income of households as each household has different sources of income. It was noticeable that household with members working in the tourism industry earn more than those that have fishing, farming and livestock as their main sources of income. The average monthly household income in the district is FJD430 with the range of FJD80-FJD1130. The majority (77%) of households earns monthly income between FJD300-FJD600, and only 4% earn monthly income of less than FJD100. It was revealed that in general, the monthly earnings are enough to meet the households' necessities. Also, overall, it can be observed that the people of Korolevu-i-wai have access to better housing facilities, durable assets and income level in comparison to most rural communities in Fiji.

Dependence on marine resources

As shown in Figure 5.7, 65 households (60% of the total households) in Korolevu-i-wai rely on the tourism industry for their main source of cash income. Out of the 65 households that get their income from the tourism industry, 58 households (49%) get income through members working directly in hotels and resorts in the field of casual laborers, food and beverage, cleaning, entertainment and administration. The remaining 11% (7 households) earn income indirectly from the industry, mainly through receiving hotel land lease money and operating small businesses such as horse riding, hair saloon and village tours and small shops.

There are only 7 households (6% of the total households) that depend on fishing as their main source of income. This does not negate the fact that fishing pressure in the district is high because the majority of the households also fish for subsistence. However, the lower number of fishing dependent households for income has some guarantee that less pressure is exerted to the fishing ground and this is if compared to a scenario where there is higher dependency on fishing for income. The remaining households have farming, livestock rearing and remittances from relatives abroad as their main sources of income. Overall, it is clear that the households predominantly depend greatly on tourism as their important livelihood. In general, there are many of sources of income in Korolevu-i-wai and the availability of cash in the district can lead to the exploration of alternative sources to take advantage of the economy in the region.

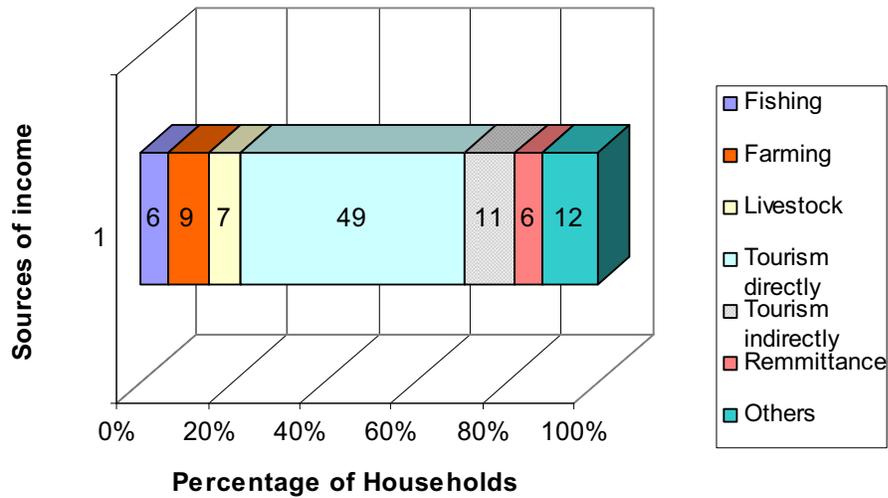


Figure 5.7: Main sources of income by households

Market Characteristics

The majority of fishers stated that the market for their catches is not always consistent. In Figure 5.8, the majority (32%) of reef fish fishermen sell their catch to the people in the community, 32% to the Korolevu store (middleman), and 17% to hotels while the remaining 15% sells their catch on the roadside. The fishermen stated that the prices in each market differ, with the hotel market being the best, buying catches at FJD8-10 per kg, compared to FJD4-6 per kg from the other markets.

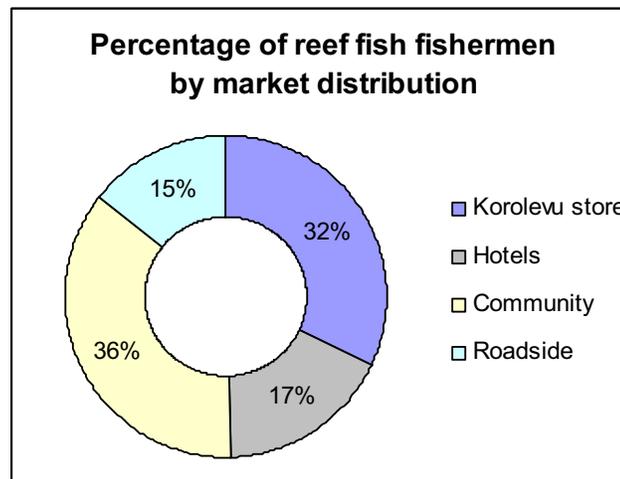


Figure 5.8: Market distribution of fishermen's catches

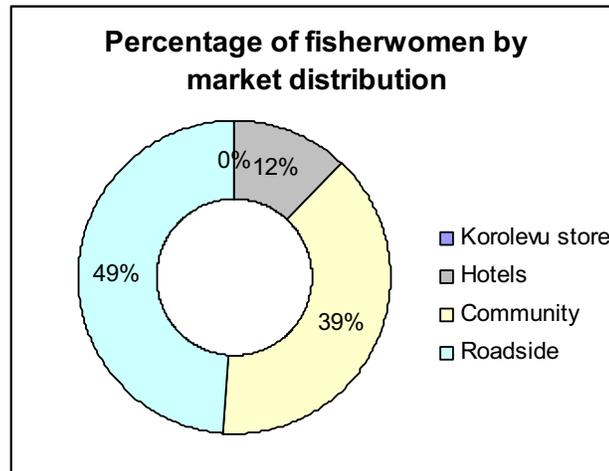


Figure 5.9: Market distribution of fisherwomen's catches

In Figure 5.9, the majority of fisherwomen sell their catches on the roadside (49%) and within the community (39%). The fisherwomen stated that the hotels do not accept their catch and this is largely due to the inconsistency of their supply and also because of the type of fish and marine products that they catch, which are mostly sedentary and non-fin fish.

RESOURCE USE FACTORS

Local and commercial resource use pattern

At present, there are only five commercial fishermen in Korolevu-i-wai who hold Inside Demarcated Area (IDA) licenses to fish in the *i qoliqoli*. The number of commercial fishermen in Korolevu-i-wai has varied somewhat over the last few years as the area has developed through the tourism industry and many of the local people have turned to work in hotels and other tourism related activities. However, many of the locals still fish for subsistence consumption. In interviews, the majority (51%) stated that there is at least one member in the household that goes out fishing weekly. Of these, 71% are women. In other households, 16% have 2 members who fish (56% women), and 9% have at least 3 members. About one quarter (24%) of the households do not fish.

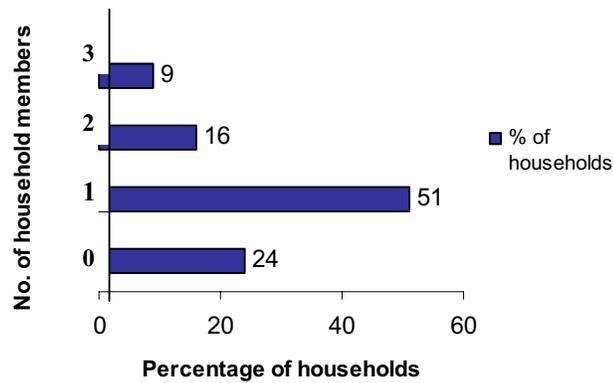


Figure 5.10: Frequency of fishing in Korolevu-i-wai

Fishing practices in Korolevu-i-wai have low impacts on the marine environment and the associated resources in comparison to most coastal communities around Fiji. This is largely due to the lower number of fishermen, lower frequency of fishing and the ineffectiveness of the fishing equipment that they utilize. Korolevu-i-wai’s fishers use a narrow range of fishing equipment, determined primarily by the area being fished and the type of species targeted. Such equipment includes gill netts, hand lines, spearguns and rods for reef gleaning (Table 5.3). There is no motorized or non-motorized fishing boat in the district. Since the area has a line of narrow fringing reefs, people who go out fishing wade or swim to their fishing spots.

Table 5.3: Fishing gear utilized in Korolevu-i-wai

Fishing Equipment	% of Fishers
Spearguns and snorkeling gear	42
Hook and line	43
Gleaning	14
Gillnet	6
Spear fishing	4

The majority (30%) of these subsistence fishers catch fish through the use of spearguns and snorkeling gear, 29% use hook and line, 29% glean on reef flats, 7% uses gillnet while the remainder (4%) uses spear for fishing. Out of the fishermen that dive using spearguns and snorkeling gears, 67% stated that they usually fish during the

night time while 33% prefer fishing during the day. Apart from the 7% of fishers that uses gillnet frequently, 32% of the total fishers also stated that they have gill nets but this is not frequently used due to the strong current in this area of narrow reef passages and close range fringing reefs.

SOCIAL FACTORS

Consensus among community

The establishment of the four fish reserves or “no take” zones in the fishing ground was used to gauge the degree of consensus amongst community members. In general, there was strong consensus in the district for the concept of setting aside parts of the whole fishing ground as reserves. However, there was some variation in the degree of consensus among community members in each village as shown in Table 5.4.

For instance, in Votua village, the whole population agreed to the concept, which resulted in the establishment of a fish reserve one week after the management planning workshop that took place in Tagaqe village. The key informants in the village stated that after the presentation from the village representatives to the workshop in the village weekly meetings, all the villagers agreed to the establishment and location of the reserve. However, in Vatu-o-lalai, about half of the population did not agree to the idea of setting up a fish reserve in the first three months after the Tagaqe workshop. After much persuasion from the village representatives to the workshop who are also members of the Korolevu-i-wai Environment Committee and deliberation in the village meeting, the people then agreed to the fish reserve concept.

Table 5.4: Percentage of respondents to degree of consensus at initial stage of project by village

Degree of consensus categories	Votua	Vatu-o-lalai	Tagaqe	Namada
No consensus (whole pop.)	-	-	-	-
Limited consensus (1/4 of pop.)	-	10	15	-
Moderate consensus (1/2 of pop.)	-	60	25	10
Strong consensus (3/4 of pop.)	10	30	55	70
Absolute consensus (whole pop.)	90	-	5	20

Level of community participation

From the key informant interviews (Table 5.5), most (61%) respondents stated that it was the members of the community that were in the forefront of holding discussions, planning and designing, and decision making regarding the establishment of the CBM project and implementation of the management actions. Only 39% stated that resources rules were established with the assistance from some individuals outside of the community.

Table 5.5: Percentage of respondent to community involvement in establishing resource rules

Community involvement in establishing rules	% of Respondents
No community member involved in establishing rules	0
A few community members involved in establishing rules	0
Some community members involved in establishing rules	0
Most community members involved in establishing rules	39
Only community members involved in establishing rules	61

The respondents further stated that the formation of the Korolevu-i-wai Environment Committee portrays the full participation of the community not only in the administration of the management project but also in following up on the effective implementation of management rules in the whole district. Pollnac and Crawford (2000), in examining the enabling factors for CBM projects' success in the Philippines, mentioned that a high level of community participation in decision making was one of the five most important factors.

GOVERNANCE FACTORS

Marine resource rights

The LMMA Network (2003) assumption of this factor is that as the strength of marine resource rights of communities increases, it becomes easier to maintain a successful CBM project. In particular, if a management is to be effective, then local stakeholder marine resource rights must be recognized by customary practice and national law so that they are enforceable. As already mentioned in Chapter 4, the Fisheries Act of Fiji recognizes the customary fishing rights areas of indigenous Fijians and this has resulted in the allocation of rights for the Fijians to utilize marine resource,

and develop and implement management strategies to conserve these resources. In this arrangement, the people of Korolevu-i-wai exercise this right to the CFRA mentioned previously. The recognition of the rights of the people of Korolevu-i-wai to make development or management decisions in their CFRA is one of the main catalysts to the effective implementation and positive impacts of the CBM project in the district, and this can also be said to other places in Fiji that have implemented similar initiatives.

Awareness of resource management rules

Through the household and key informant interviews, respondents were asked to list the resource management rules that were resolved at the Tagaqe management planning workshop and which were related to them by each village representatives. The results showed that the majority of the respondents are aware of most of the resource rules as shown in Table 5.6.

Table 5.6: Percentage of respondent to awareness of marine resources management rules

Resources rules	% of Respondents Aware of Rules
Proper management of waste	77
Ban on the use of derris root	96
Ban on the use of undersized fishing nets	73
Ban on the fishing of undersized fish	57
Ban on coral harvesting	100
Establishment of fish reserves	100

On the question on the mode or medium through which the respondent came to know about these resource rules, 43% of the respondent stated that they heard it through having conversations with other members of the community who are aware of the rules, 34% knew it from village meetings and other formal gatherings while the remaining 33% stated that they knew of these rules from having read the whole management planning workshop report.

Compliance and enforcement

In general, almost all (83%) respondents stated that the community of Korolevu-i-wai complies well with the above mentioned resource rules while only a few (17%) mentioned that the development of a strategy to ensure that the people adhere to the resource rules should be pursued, as some are still not aware of the rules. The majority of the 17% of respondents mentioned above are from Namada village and they stated that most violators are the people from Koroinasau, the neighboring district which also holds rights to the Korolevu-i-wai CFRA, as highlighted earlier. Since the people from the district of Koroinasau were not represented in the initial stage of the development and implementation of the management actions, nearly all of them, as mentioned by Namada villagers, were not aware of the whole initiative, let alone the resource management rules. The resource rule that people most often violates is the use of derris root for catching fish. In Votua village, respondents mentioned that the relatives of Votua Housing residents, who sometimes spend the weekend and holidays in the area, are responsible for poaching in the fish reserves. Also, this situation is largely attributed to the lack of awareness of the resource rules by these short-term migrants.

Leadership

The input of local leaders, in this case traditional chiefs, in the project was the variable used to test the influence of this institution to the effectiveness and sustainability of this initiative. There were mixed results with this analysis, as shown in Table 5.7. The input of the paramount chief of Korolevu-i-wai to the project at the district level and also the input of each village chief to the project at village level was relayed by the respondents.

Table 5.7: *Percentage of respondents by extent of leaders' input to the CBM project*

Input categories	A	B	C	D	E
None	-	-	17	-	-
Little	37	-	48	-	30
Some	46	34	27	23	53
Good	17	57	9	67	27
Great	-	9	-	10	-

A- district's paramount chief (Tui Davutukia), B- Votua village chief, also A., C- Vatu-o-lalai village chief, D- Tagaqa village chief, E- Namada village chief

In general, the paramount chief of the district does not really have an impact on the project at the district level, however, at village level, the majority of the respondents in his village stated that he plays a major role in the implementation of the project in Votua village. A reason for this may be due to the failure on the part of the organizers of the initial discussions and workshops in involving him as the paramount chief of the district. This was obvious throughout the process of engagement whereby, he was not part of any activity.

Also, during the management planning workshop which was held in Tagaqe village, there was a lack of facilities or space for such a large gathering. However, the community hall in Votua (village of the paramount chief) would have been a better option for it offered better facilities and in the Fijian “way of life”, such a venue would carry weight in the way the people in the district see the project. Most of all, it would ensure the blessings of the *vanua*. This issue is also one of the major challenges of the project in the district because with the present arrangement, whereby the Korolevu-i-wai Environment Committee administers the project, there is no guarantee of the legitimacy of decisions made. In the Fijian “way of life” the paramount chief decides on development or management activities that take place in the CFRA and with his authority he can, therefore, suspend any activities that the people have already set in place at any time.

At the village level, the village chiefs in the district all play an important role in the effective implementation of the project. Nearly all respondents stated that consensus was well achieved in each village when the village chief made his decisions. In the case of Vatu-o-lalai, the respondents from the village stated that the village chief has little input to the project and this may be a factor for the failure of achieving better consensus amongst village members at the initial discussion for the establishment of the fish reserve, as already mentioned in the section on “degree of consensus”.

THE SOCIAL AND ECONOMIC IMPACTS OF THE CBM PROJECT

The first part of this research aims to examine the social and economic impacts of the CBM project on the communities of Korolevu-i-wai. The project took a while to progress well in the district due to lack of awareness of the project. However, over the past two years (2003-2004), the communities have started to acknowledge the changes that they have experienced. The measures of these impacts were not precise; therefore, a wide array of parameters were examined. These parameters (Table 5.7) are discussed below. In order to demonstrate the outcome or impact of the CBM project, the measurement of certain parameters extracted from household and key informant surveys were made by comparing them between two time periods, that is, before the start of the CBM project (pre-project, 2002) and present time (2004 onwards)

T-TEST ANALYSIS OF PROJECT IMPACTS

There were 9 impact indicators to measure the outcome of the CBM project in Korolevu-i-wai, whereby 5 indicators were used to measure social outcomes, 2 indicators to measure economic outcomes and 2 measured sustainability (Table 5.8). The measurement of the CBM impacts was based on “a visual, self-anchoring, ladder-like scale” (Katon *et al.* 1997) which appears in a form of a ladder diagram. The ladder diagram is composed of 7 steps, where the first step on the ladder describes the worst possible situation. As the step goes higher, the situation gets better, with the highest step (7) describing the best possible situation (Katon *et al.* 1997).

Table 5.8: Socioeconomic impact indicators of CBM project in Korolevu-i-wai district

Group of Socioeconomic Impacts	List of socioeconomic impacts
Social	Social cohesion
	Condition of fishery resources
	Cleanliness of community environment
	Model for neighboring communities
	Community understanding of the value of the resources
Economics	CPUE by local fishers in harvest areas
	Fishermen’s income level
Sustainability	Self-governance of project
	Reduction of threats to marine resources

The mean values of each impact indicator were compared between the present (2004) and pre-project (2002) stages, with their differences tested statistically using the t-test method. From the analysis, all impact indicators have changed positively between the pre-project and present status, with 8 indicators having changed highly significantly. That included all indicators (2 indicators) related to economics, 4 out of 5 indicators related to social development and all indicators related to sustainability (Table 5.9). From the results it can be concluded that the CBM project has produced good outcomes overall, such as increased catch per unit effort of fishers, enhancement of the understanding of the general community concerning the value of marine resources, improvement of fishery resources and fishers' incomes, reduced threats to marine resources, community cooperation and support of project initiatives.

Table 5.9: Changes in impact indicators for all respondents in Korolevu-i-wai district

Impact indicators	T1	T2	T2-T1	t(T2-T1)
Social cohesion	2.26	6.10	3.50	5.83**
Condition of fishery resources	3.18	5.88	2.71	4.23**
Cleanliness of overall community environment	4.67	5.88	1.21	2.46*
Understanding on value of resources	2.73	6.36	3.63	6.07**
A model for neighboring communities	1.86	6.58	4.72	7.97**
CPUE by local fishers in harvest areas	3.03	5.53	2.50	3.62**
Fishermen's income level	3.60	6.17	2.57	3.67**
Self-governance project	2.35	6.21	3.86	6.33**
Reduction of threats to marine resources	3.17	5.98	2.81	4.57**

* $p < 0.05$, ** $p < 0.01$

Notes: T1-Before CBM project started (2002) and T2-Present (2004).

DESCRIPTIVE ANALYSIS OF IMPACT INDICATORS

Improved Social Cohesion

In Table 5.10, the majority (84%) of the respondents stated that the project is able to unite the people of the district to some degree.

Table 5.10: Degree of social cohesion in the district

Degree of social cohesion	Improve	No change	Worse
Respondent (%)	84	12	4

Most of the respondents cited the formation of the Korolevu-i-wai Environment Committee as an example of a good degree of social cohesion among the four villages and settlements in the area. The committee is able to provide a forum whereby the people can address and tackle environmental and development issues as a district rather than by individual village or settlement. Even though there are district wide social groups, mainly religious and school committee, the KEC is the first board to include representatives from the four villages and settlements and to address development and environment issues. The respondents stated that before the implementation of the project, each village and settlements dealt with these issues individually and the only forum which provided for these discussions was the bi-annual district meetings. The majority of the respondents (78%) further stated that the KEC example can lead to the formation of other similar and important groups that address other social issues at the district level, and it also proves that people in the district can now work cohesively in addressing other social issues experienced by the district.

Improved condition of fishery resources

Based on the household and fishermen surveys, the perception of marine fishery resources before and after the implementation of the CBM project is depicted in Table 5.11. The fishers in Korolevu-i-wai perceived that the status of fishery resources before the project were mostly slightly bad, bad and very bad conditions (approximately 93%). At present, perceptions are mostly neither bad nor good, and slightly good conditions (about 72%). Nonfishers' perception of the status of fishery resource before and after the project are as follows: slightly bad, bad and neither bad nor good conditions (about

86%) before, whilst after the implementation of the project, indicate mostly slightly good, good and very good conditions (about 84%).

Table 5.11: Perception of the community on the status of fishery resources (before and after implementation of the CBM project)

Perceived condition (%)	Before project		After project	
	Fishers	Non-fishers	Fishers	Non-fishers
Very bad	21	0	7	0
Bad	36	0	29	0
Slightly bad	30	5	43	8
Neither bad nor good	6	10	14	8
Slightly good	7	15	7	25
Good	0	45	0	42
Very good	0	25	0	17

From the result, it can be noted that the fishers and nonfishers perceived that the current status of fishery resources are better at present compared to before the project. Moreover, the fishers and nonfishers in Korolevu-i-wai believe that the CBM initiative is essential to better fisheries management.

A cleaner overall community environment

The majority of the respondent (67%) in the household and key informants interview stated that the state of their marine, terrestrial and village environment has greatly improved over the three years of the establishment of the CBM project. While conducting surveys in the district, this claim was proven through personal observations of the different management actions that each village is engaged in that ensure the achievement of a cleaner environment. The Korolevu-i-wai *i Soqosoqo Vakamarama* (Women’s Group) is now the leading group in overseeing the proper management of wastes in their villages and settlements.

In the four villages, it was evident that communities were willing to keep their environment clean through proper management of waste and rubbish in the village, along the beach and within the restoration program/area of the marine environment. In Vatu-o-lalai, the village made an arrangement with the Naviti Hotel for the collection

of household refuse and other solid wastes, which are to be transported to the rubbish dump twice in a week so as to ensure proper disposal. In Votua and Namada village, the people have started to replant native coastal vegetation in order to counter the problem of beach erosion in the area. In Tagaqe, the community has started to replant mangrove on the shoreline with the aim of providing a nursery ground for fish and also to reduce the intensity of wave and current action on the shore, which are often the main causes of coastal erosion. The village of Tagaqe is also embarked on a coral restoration project in collaboration with the Hideaway Resort. This activity aims to restore the resort reef front, create awareness among the people on the need to manage the resources and also to prevent coral extraction from reefs for the aquarium trade.

A model for neighboring communities

The CBM project in the district of Korolevu-i-wai provides a regional example of a project that improves the social and economic levels and environmental awareness of communities. The Korolevu-i-wai model has enabled the neighboring districts to show interest and willingness for the implementation of similar projects. In 2004, the district of Komave, on the east, started with the implementation of CBM project and to date, the communities have started to experience similar changes, even though there is an absence of a thorough study.

Lately, the district of Conua, in the west, has also started with a similar effort. The district of Conua is one of the major suppliers of live rock to traders such as Walt Smith International, however, with the Korolevu-i-wai experience, the people have realized the harmful effects of this trade. To date, the people of Conua have embarked on an effort to discontinue the live rock business and also set up no fishing areas in their fishing ground.

Greater community understanding of the value of the resources

Overall, there is greater understanding of the values of the marine environment and the resources associated with it to the people in Korolevu-i-wai, as indicated by the responses to the different statements concerned with marine environment values (Table 5.12).

Table 5.12: Responses to value of resources statements

Statements	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree	Total
Marine resources provide sustenance to my family	75	15	5	5	0	100
My family gets cash benefits from our marine resources (eg. Fish, tourism etc.)	70	22	8	0	0	100
My community gets cash benefits/food from our marine resources (eg. Fish, tourism etc.)	86	14	0	0	0	100
It is an important to ensure the sustainability of these resources.	72	21	7	0	0	100
There re no threats to our marine resources	0	0	5	11	84	100
Effective resource management is needed to manage these resources	65	30	5	0	0	100

The question of whether the responsibility for fishery management in the area should be taken on by outside organizations and/or the fishing community was further asked to the respondents. All respondents replied that outside institutions and the community should be jointly responsible for fishery management, but in different degrees. The majority (about 74%) replied that the community have most responsibility, 16% argued that the outside organizations and the community should be equally responsible, with the remaining 10% in favor of outside agencies having the most responsibility.

Increase in CPUE by local fishers in harvest areas

There was no existing data available regarding the level of fishermen's catches in terms of catch per unit effort before the implementation of the projects. However, questions were asked of fishermen about their level of catch before the implementation of the project and this was compared with the data collected from the creel survey. Fishermen were given the opportunity to indicate the fishery which they are specialized in and for which they are able to give more accurate data about their catch. In all cases, the 10 women fishers gave data on their catches regarding the octopus fishery while the 13 men fishers provided the reef fish catch data. Figure 5.11 summarizes these findings

and overall, there has been a noticeable increase in the CPUE level of fishers in Korolevu-i-wai district.

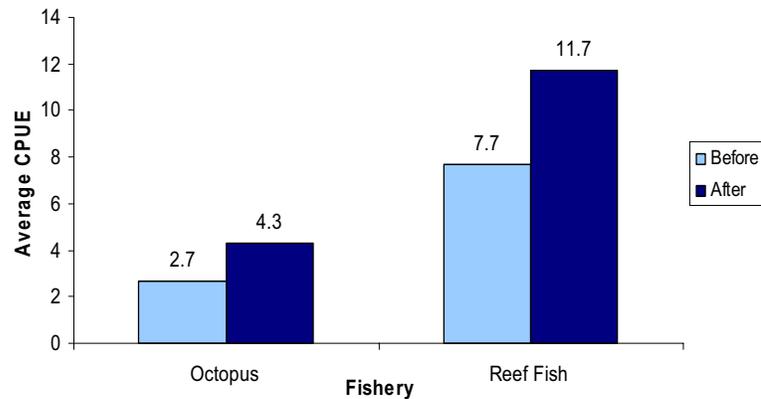


Figure 5.11: Average CPUE of octopus and reef fisheries (before and after the project)

Data recorded through the estimated catch survey produced the CPUE range of 1-5 heaps of octopus before and 3-7 heaps after the project and an estimated increase of average CPUE of 4.3 heaps of octopus per fisherwoman per trip in comparison to the 2.7 before the project started. On average these fishers fish 1.7 times a week, therefore, the annual landing per fisher was 220.3 heaps before the project and now has increased to 350.9 heaps. The annual landing analysis is valid if the frequency of fishing of these fishers is consistent throughout the year.

During the analysis it was also noted that 50% of the fisherwomen are now able to obtain some of their catch in the “house reef”, or the immediate reef next to the coastline, rather than being concentrated in the lagoons and reef crest. Three fisherwomen also cited that the individual octopus are now bigger in size compared to the ones before the project. For instance, in Namada village, a fisherwoman revealed that her individual catch has not changed substantially, however, the sizes of these individuals have increased, resulting in the increase in the number of heaps she sells. During the interview with this particular fisherwoman, who originates from Namatakula but is married to a man in Namada, she mentioned that she is now able to see and catch the sizes of octopus that she used to catch 30 years ago when she was a young girl who just got married into the village.

For men fishers, there has also been an increase of reef fish catches. The catch range before and after the project are 4-11 kg and 5-19 kg, respectively. Prior to the establishment of the project, the average CPUE for this fishery was 7.7 kg per fishermen per trip and today it has increased to 11.7 kg per fishermen per trip. However, there was no noticeable difference in the areas where these fishers fish.

Increase in fishermen’s income level

From the above mentioned figures, the overall income level for fishers in the area increased after the implementation of the project as indicated in Figure 5.12. The present price as indicated by the fisherwomen interviewed of a heap of octopus is FJD10.00 per heap. Therefore, income level of these fishers increased from FJD27.00 before to FJD43.00 after the implementation of the project. The estimated annual income of the fisherwomen therefore, has increased from FJD2203.00 before to FJD3509.00 after the implementation of the project.

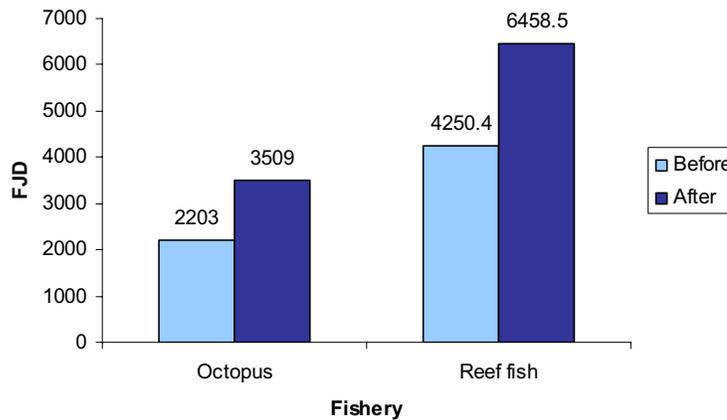


Figure 5.12: Average annual income of fishers

For the reef fish fishery, the value of a kilogram of these fish is FJD5.00 at the local markets, hence, the fishers’ income level has also increased from FJD38.50 before to FJD58.5 after the implementation of the project. Therefore, the average annual income of a fisher is FJD6458.5 compared to FJD4250.40 before the project.

Self-governance project

The CBM project in Korolevu-i-wai is administered and controlled by the Korolevu-i-wai Environment Committee, a local committee consisting of representatives from the four villages, the settlements and the hotels in the area. The roles of this committee are to raise environmental awareness of the people in the district, raise environmental issues to district meetings and other formal fora, conduct monitoring surveys and policing of existing or implemented management actions. The committee holds monthly meetings, where discussions of emerging issues regarding the project take place and representatives also report the project development at their village.

The localization of management regimes as demonstrated by the Korolevu-i-wai project contributes a lot to the sustainability of such initiatives because firstly, with such an arrangement, the community feels it has ownership of the project, which in most cases always gives them the potency to ensure effective implementations of management strategies. Also, with this arrangement, communities are able to make management decisions by themselves rather than being dependent on mostly donor-dependent partner organizations, which at times are always busy with other sites and projects.

Reduction of threats to marine resources

Using the Threat Reduction Assessment (Appendix 5.2) guide developed by Margoluis and Salafsky (1999), this part of the analysis was formulated by assessing the threat reduction index of the following threats, which were identified in the management planning workshop:

- Non-compliance to conservation resolutions
- Destruction of reef
- Sewage (polluted water)
- Rubbish dumping on seashore (plastic/iron)
- *Duva*
- Burning
- Coral harvesting
- Lack of awareness of the vulnerability of our natural resources
- Use of small fishing nets
- Overfishing

Table 5.13: Threat reduction assessment result

THREATS		CRITERIA RANKINGS			TOTAL RANKNG	% THREAT REDUCTION	RAW SCORE
		ARE A	INTENS ITY	URGEN CY			
1	Non-compliance to conservation resolutions	8	3	5	16	70	11.2
2	Destruction of reef	2	6	4	12	60	7.2
3	Sewage (polluted water)	9	10	8	27	20	5.4
4	Overfishing	7	8	10	25	100	25
5	Rubbish dumping on seashore (plastic/iron)	4	5	3	12	60	7.2
6	Duva	5	4	9	18	60	10.8
7	Burning	1	2	1	4	50	2
8	Coral harvesting	6	7	7	20	100	20
9	Lack of awareness of the vulnerability of our natural resources	10	9	6	25	70	17.5
10	Use of small fishing nets	3	1	2	6	100	6
TOTAL		55	55	55	165		112.3

TRA INDEX FORMULA	TOTAL RAW SCORE		TOTAL RANKING		COVERT TO %				TRA INDEX
TRA INDEX CALCULATION	112.3	/	165	=	0.68	X	100	=	68%

The data (Table 5.12) were collected through focus group interviews, whereby key informants in the area were asked for their perceptions of the degree of reduction or increase of these threats. In general, the Korolevu-i-wai community has been able to reduce the collective threats in the three-year period of the project from 2002 to 2005 by 68%. All the threats were reduced to some degree, with coral harvesting, use of small fishing nets and overfishing being eliminated completely or in other words, reduced by 100%. The other threats were reduced by more than half; however, sewerage or polluted water was only reduced by 20%.

CONCLUSION

This chapter has discussed the geographical, social, economic, and political settings of the study site. These elements of a society all contribute to the shaping of the Korolevu-i-wai social structure and are also responsible for the effective drawing up of strategies for how the community can tackle issues. This chapter also gave a description of the development of the CBM project in the area, highlighting the social and economic factors that contribute to the achievement of the CBM project goals in the district of Korolevu-i-wai. It has shown the importance of considering social, economic, governance and political settings and issues, for these can be catalysts for the positive results of such initiatives. This chapter has also highlighted some of the challenges of the project in the district, which are critical to project sustainability in the long term.

The chapter highlighted and discussed some of the social and economic impacts of the project on the people of Korolevu-i-wai. The positive impacts of the project affectively answer critics of the CBM approach. The Korolevu-i-wai CBM project has not only demonstrated that the CBM approach is able to meet modern day management goals by enhancing the level of marine resources and reducing threats effectively, but it also verified that it improves the livelihood of the people who depend on these resources and increase their understanding of the values of these resources. The final chapter of this thesis presents recommendations on how effective resource management can be attained and how the CBM approach can be best adopted and effectively implemented in Fiji.

CHAPTER 6: THE WAY AHEAD; CONSOLIDATION OF EXISTING EFFORTS

MAJOR FINDINGS AND CONCLUSIONS

The study of the impacts of the CBM project in Korolevu-i-wai district has demonstrated how the approach has contributed to the enhancement of the social and economic standards of the people who rely on these resources. It also offers a few insights into how the marine environment and associated resources can be well managed to allow sustainable utilization of these resources.

The following results and conclusions are rooted in the literature survey, analysis of data collected from questionnaires, personal observations and in-depth interviews with the community in the district. The consideration and adoption by concerned institutions of the suggestions and recommendations of this study regarding the effective implementation of the CBM approach, will lead to a better understanding of the elements of the community that underpin the effectiveness of this concept. The recommendations also seek to promote and encourage the adoption of CBM in fisheries management, while ensuring the sustainability of the approach in the long-term.

The CBM project in Korolevu-i-wai has inspired such efforts throughout the Coral Coast region. It has served as a learning laboratory that highlights the value of the marine environment and the potential of communities to manage their own natural resources. Nonetheless, management of such a project needs to adapt to evolving circumstances. Without addressing the larger issues such as improper discharge of liquid waste from hotels and households and lack of community control in Korolevu-i-wai's case, such initiatives will come under increasing pressure and are likely to ultimately fail.

Chapter 5 has examined in detail the CBM initiative in Korolevu-i-wai, Nadroga. The analysis of the social and economic factors that contribute to the achievement of the project outcomes provides the first part of this study. An understanding of this aspect of CBM projects will contribute to improving the design of CBM for more effective and sustainable efforts. This study showed that the key conditions for the success of this project include:

- the CFRA arrangement which recognizes the rights of the people to make development and management decisions regarding their *i qoliqoli* proves to be the main factor in the achievement of the project outcomes. In this arrangement, the people feel ownership of the project and are keen and willing to plan, design, implement and evaluate their own management actions.
- the user rights given through the CFRA arrangement and the recognition of the customary rights of traditional groups give the people in the community the desire to keep and manage their resources effectively. The people believe that the wellbeing of their future generations depends heavily on them. Therefore, they feel obliged to undertake the role of safeguarding the sustainability of their *i qoliqoli* and its resources.
- the homogeneity of the group that makes decisions regarding the *i qoliqoli* in Korolevu-i-wai is valuable in this initiative. Even though the population of Korolevu-i-wai is very diverse in terms of place of origin, religion and beliefs, the people who by right have the authority to make decisions are the people of the *vanua* of Davutukia. Hence, consensus decisions are effortlessly achieved.
- the low dependence of the people of Korolevu-i-wai on the marine environment for sustenance and income, poor markets and the availability of other sources of income through the tourism industry in the region, are factors that reduce fishing pressure on the *i qoliqoli*. Only a handful (6%) of households depend heavily on the marine environment as their main source of income.
- the active participation of the people in project design, implementation and evaluation of management actions compliments the above mentioned factors. Furthermore, the coordination of the project at the district level through the Korolevu-i-wai Environment Committee is a factor that has contributed a lot to the achievement of the project outcomes.
- the active participation of traditional leaders in villages of Korolevu-i-wai was a catalyst in the achievement of the project goals. The chiefs in each village were vocal in the initial discussions of this project in their village and they have also provided the constant support needed throughout the

project process. The chiefs provided the social cornerstones and pillars of this initiative in Korolevu-i-wai district.

The latter part of the analysis in Chapter 5 examines the social and economic impacts of the CBM project on the people in Korolevu-i-wai. It has drawn a number of significant findings, concluding:

- there has been an improved social cohesion amongst the community members of Korolevu-i-wai. The majority (84%) of the respondents stated that the project has improved the degree of social cohesion in the community in comparison to the period before the project.
- the condition of fishery resources is perceived to be somewhat improved after the initialization of the project in the district.
- the average CPUE of octopus fisherwomen has increased from 2.7 heaps /fishing trip to 4.3 heaps/fishing trip and catch increase from 7.7 kg/fishing trip to 11.7 kg/ fishing trip for the reef fish fishermen.
- the income level of fishers has increased. The estimated average annual income of the octopus fishery fisherwomen has increased from FJD2203.00 to FJD3509.00. For the reef fish fishermen, their average annual income has increased from FJD4250.40 to FJD6458.5.
- the state of their marine, terrestrial and village environment has greatly improved over the three years of the establishment of the CBM project. Most of the inland environmental issues have been addressed by each village, for instance, proper solid waste management and coastal reforestation.
- the Korolevu-i-wai project has served as a model of good environmental management practice for neighboring districts in the Coral Coast region and other parts of Fiji.
- there is improved understanding of the values of the marine environment and the resources associated with it by the people of Korolevu-i-wai. Also, the people now understand their roles in the effective management of their environment.

- the Korolevu-i-wai Environment Committee model has demonstrated how the people can coordinate and manage such initiatives at the community level through the formation and establishment of a forum that is recognized by the people.
- there has been a 68% reduction of the collective environmental threats in the district

The findings of this research reveal that significant relationships exist between the roles of the people in resource management, social and economic settings of communities, social and economic benefits of CBM initiatives and sustainability of such projects and the marine resources. Implementation of externally driven resource policies and projects should be disallowed, as most have failed to achieve their goals and may cause confusion and negative impacts to existing community based initiatives.

RECOMMENDATIONS

For effective and sustainable management at the community level

1. Implementing agencies should be cautious and mindful of the socio-political settings of a community during all phases of the project and especially, during the initial discussion and planning phases. This is important because such initiatives should be rightly channeled into the existing social framework rather than creating or boosting an existing self-styled framework which is not always recognized legally and traditionally. Generally, mainstreaming management activities into such institution lead to unsustainable projects and project failure because often those who represent these institutions always use these initiatives for their own personal gain and not for the community as a whole.
2. The CBM approach, as in the case of Korolevu-i-wai district, should not focus only on the restoration of the marine environment, but also on refurbishment of the terrestrial, village area and most importantly on improving the social relations within and outside the community. Therefore, to compliment the restoration of the marine environment, inland and social issue should also be addressed by managers and practitioners.

3. CBM projects such as Korolevu-i-wai need sustained support from the government and non-government sectors in a manner that does not marginalize local communities. In this arrangement, the people should take the leading role in all aspects of the project while partners facilitate the processes. In most cases, the communities should dictate the management and administrative actions to be implemented rather than implementing agencies..
4. The adoption by implementing agencies of the adaptive management process as in the Korolevu-i-wai case, should be the basis of CBM initiatives in Fiji. In most cases, implementing agencies tend to focus more on their own agenda and neglect the needs of the communities. This scenario leads to distrust and suspicion among partners and to the failure of projects.
5. Social and economic factors should be addressed in the development, implementation and evaluation of community management actions. These factors provide the links between resource management and people's wellbeing and if not addressed, it may shake the very foundation of achieving effective resource management in communities.
6. Other stakeholders within a community such as tourism operators, should be involved so that their activities can be well managed to minimize environmental damage and maximize local benefits. Full collaboration is necessary among government, private sector, and local communities. Local resort owners and dive operators can assist in protecting the reefs they most frequent with paying guests if approached by communities, such as in the Mike's Diver case.

For effective and sustainable management at the national level

1. Strengthening the CBM approach, rather than weakening it, should be the preferred policy in the management of the inshore areas that are beyond the practical jurisdiction of the Fiji Fisheries Department. The case study has demonstrated that subsistence fishing still dominates and the local communities that are dependent on the resources for their livelihoods should be in a position to manage those resources.

2. Also, where commercial exploitation of local resources is a possibility, for example in the cases of beach-de-mer, strengthened CBM puts the local communities in a more advantageous position to negotiate with traders rather than the Fisheries Department doing the work.
3. The resilience of management and conservation plans is enhanced by the clear access rights that should be a feature of strengthened CBM.
4. The Fiji Government should act as the provider of the framework within which community decision-making can operate if effective inshore resources management is to be achieved in Fiji. The framework has to be more effectively concentrated on providing appropriate information to provide a fair foundation for community decision making rather than trying to make those decisions at the government level.

For research work

1. Thorough research to monitor fish populations, coral reef conditions, and social and economic dynamics should be conducted in other sites around Fiji to further scrutinize and analyze the value of the CBM approach in the country. This type of research will supply community members and policy makers with useful information to support the adaptive management process.
2. Identification of possible sustainable alternative livelihood options information should be conducted to allow communities with scarce marine resources in the *i qoliqoli* to generate income and to ease the pressure on the marine environment.

Other recommendations

1. This case study has noted that women play a vital role in the management of the marine environment and associated resources because they account for most fishing activities and they also have existing groups such as the *i soqosoqo vakamarama* (women's group). Implementing agencies therefore, should facilitate the mainstreaming of such groups into CBM programs.

As a final point, this thesis has established that there is a critical link in the CBM approach between human activities, declining marine resources, roles of the people in the restoration process and the impacts of these programs on the social and economic standards of the communities. It is hoped that government, implementing agencies, communities and concerned institutions will adopt, among other pertinent plans some of the proposed recommendations. These recommendations and future refinement and adoption of the CBM approach will ensure the sustainable development and management of the marine environment and resources in Fiji for the present and future generations.

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DEPENDENCE ON THE MARINE RESOURCES

Please tick the appropriate box for the household main sources of income:

_____ work directly in tourism industry _____ work indirectly in tourism industry
 _____ fishing _____ farming _____ livestock rearing _____ remittances _____ others

RESOURCE USE PATTERN

a. How many people from your household have gone fishing in the past month?

b. How many fishing trips did each person do in the past month?

Person 1	M or F ?	Number of trips =	Each trip was about	hours
Person 2	M or F ?	Number of trips =	Each trip was about	hours
Person 3	M or F ?	Number of trips =	Each trip was about	hours
Person 4	M or F ?	Number of trips =	Each trip was about	hours
Person 5	M or F ?	Number of trips =	Each trip was about	hours
Person 6	M or F ?	Number of trips =	Each trip was about	hours
Person 7	M or F ?	Number of trips =	Each trip was about	hours

c. 1 Methods of fishing used by the household.

Tick (✓) ONE of the boxes in each row

- hand collecting or gleaning	used	<input type="checkbox"/> none	<input type="checkbox"/> 1/4	<input type="checkbox"/> 1/2	<input type="checkbox"/> 3/4	<input type="checkbox"/> all	of the time
- diving/spargun, snorkel, mask, fins	used	<input type="checkbox"/> none	<input type="checkbox"/> 1/4	<input type="checkbox"/> 1/2	<input type="checkbox"/> 3/4	<input type="checkbox"/> all	of the time
- hook and line	used	<input type="checkbox"/> none	<input type="checkbox"/> 1/4	<input type="checkbox"/> 1/2	<input type="checkbox"/> 3/4	<input type="checkbox"/> all	of the time
- trolling	used	<input type="checkbox"/> none	<input type="checkbox"/> 1/4	<input type="checkbox"/> 1/2	<input type="checkbox"/> 3/4	<input type="checkbox"/> all	of the time
- gill netting	used	<input type="checkbox"/> none	<input type="checkbox"/> 1/4	<input type="checkbox"/> 1/2	<input type="checkbox"/> 3/4	<input type="checkbox"/> all	of the time
- spearfishing	used	<input type="checkbox"/> none	<input type="checkbox"/> 1/4	<input type="checkbox"/> 1/2	<input type="checkbox"/> 3/4	<input type="checkbox"/> all	of the time
- others	used	<input type="checkbox"/> none	<input type="checkbox"/> 1/4	<input type="checkbox"/> 1/2	<input type="checkbox"/> 3/4	<input type="checkbox"/> all	of the time

c.2 Destructive fishing methods used

Tick (✓) one of the boxes in

each row

- Duva	used	<input type="checkbox"/> none	<input type="checkbox"/> 1/4	<input type="checkbox"/> 1/2	<input type="checkbox"/> 3/4	<input type="checkbox"/> all	of the time
- Laying of net overnight	used	<input type="checkbox"/> none	<input type="checkbox"/> 1/4	<input type="checkbox"/> 1/2	<input type="checkbox"/> 3/4	<input type="checkbox"/> all	of the time
- Breaking of corals and rocks	used	<input type="checkbox"/> none	<input type="checkbox"/> 1/4	<input type="checkbox"/> 1/2	<input type="checkbox"/> 3/4	<input type="checkbox"/> all	of the time
- Harvesting of undersized fish	used	<input type="checkbox"/> none	<input type="checkbox"/> 1/4	<input type="checkbox"/> 1/2	<input type="checkbox"/> 3/4	<input type="checkbox"/> all	of the time
- Use of undersized net	used	<input type="checkbox"/> none	<input type="checkbox"/> 1/4	<input type="checkbox"/> 1/2	<input type="checkbox"/> 3/4	<input type="checkbox"/> all	of the time

COMMUNITY UNDERSTANDING OF THE VALUE OF THE RESOURCES

Please tick the appropriate box:

Statements	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
Marine resources provide sustenance to my family					
My family gets cash benefits from our marine resources (eg. Fish, tourism etc.)					
My community gets cash benefits/food from our marine resources (eg. Fish, tourism etc.)					
It is an important to ensure the sustainability of these resources.					
There re no threats to our marine resources					
Effective resource management is needed to manage these resources					

Comments:

CONDITION OF FISHERY RESOURCES

Please tick the appropriate box

Perceived condition	Before project		After project	
	Fishers	Non-fishers	Fishers	Non-fishers
Very bad				
Bad				
Slightly bad				
Neither bad nor good				
Slightly good				
Good				
Very good				

Comments:

SOCIAL COHESION

Please tick the appropriate box

Degree of social cohesion	Greatly improve	Improve	Slightly improve	No change	Slightly worse	Worse	Much worse
Respondent							

Comments

ECOLOGICAL KNOWLEDGE

1. Is the amount of fish, crabs in the mangroves, and other marine resources better off, worse off, or about the same as it has been over the past 10 years?
2. What do you think are some of the factors that influence this change?
3. What different types of resource (appropriate, highly differentiated types) do you know?

OBSERVATION ONLY INFORMATION.

HOUSING

1: Type of dwelling: bure light material plus wood or lumber light material wooden/bamboo combination of wood and iron roofing concrete and galvanized roof made of concrete, wood ceramic roof of good quality

DURABLE ASSETS

2: Furniture and appliance ownership: radio tape/cd player gas stove bed sewing machine T.V/Video T.V refrigerator cooking stove washing machine microwave electric fan

Appendix 1.2

QUESTIONNAIRE FOR KEY INFORMANTS

1. Degree of Consensus

Degree of Consensus	Timeframe	KI 1	KI 2	KI 3	KI 4	KI 5	KI 6	Average Score for Project
Q1 Degree of consensus	Start 2004							
Comments (stories/ anecdotes)								

1 = no consensus 2 = limited consensus 3 = moderate consensus 4 = strong consensus 5 = absolute consensus

2. Local Engagement

Local Engagement in the Project	Timeframe	KI 1	KI 2	KI 3	Average Score
Level of Engagement	Start 2004				
Comments (stories/ anecdotes)					

1 = no awareness of project 2 = limited awareness; no active participation 3 = considerable awareness 4 = limited participation
5 = extensive participation

3. Resource Rules

Resource Rules	Timeframe	KI 1	KI 2	KI 3	KI 4	KI 5	KI 6	Average Score
3.1 Degree of awareness of rules	Start 2004							
3.2 How simple and clear the resource rules are?	Start 2004							
3.3 Involvement of local stakeholders in the establishment of rules	Start 2004							
Comments (stories/ anecdotes) for 3.1								
Comments (stories/ anecdotes) for 3.2								
Comments (stories/ anecdotes) for 3.3								

For

1 = no local stakeholders aware of the rules 2 = few local stakeholders aware of the rules
3 = some local stakeholders aware of the rules 4 = most local stakeholders aware of the rules 5 = all local stakeholders aware of the rules

3.1

For 3.2

1 = rules are very complex and difficult to understand 2 = rules are complex and difficult to understand 3 = rules are of average complexity
4 = rules are simple and easy to understand 5 = rules are very simple and easy to understand

For 3.3

1 = no local stakeholders involved in establishing rules 2 = a few local stakeholders involved in establishing rules 3 = some local stakeholders involved in establishing rules
4 = most local stakeholders involved in establishing rules 5 = only local stakeholders involved in establishing rules

4. Compliance and Enforcement of Rules

Compliance and Enforcement of Rules	Timeframe	KI 1	KI 2	KI 3	KI 4	KI 5	KI 6	Average Score
4.1 Violations of rules	Start 2004							
4.2 Credibility of enforcers	Start 2004							
Comments (stories/ anecdotes) for 4.1								
Comments (stories/ anecdotes) for 4.2								

For 4.1

1 = almost no compliance with LMMA rules (numerous violations reported or known) 2 = limited compliance with LMMA rules 3 = moderate compliance with LMMA rules 4 = good compliance with LMMA rules 5 = excellent compliance with LMMA rules (almost no violations reported or known)

For 4.2

1 = enforcer does not have authority (is not credible)
 2 = enforcer has authority, but not the means and/or history of acting on this authority (has low credibility)
 3 = enforcer has authority and the means to act on their authority, but not the demonstrated history of doing so (has moderate credibility)
 4 = enforcer has authority and the means and history of demonstrating their ability to act on their authority (has high credibility)

7. Leadership Questionnaire

Leadership	Timeframe	KI 1	KI 2	KI 3	KI 4	KI 5	KI 6	Average Score
Degree of effectiveness of leader.	Start							
	2004							
Comments (stories/ anecdotes)								

- 1 = leader has no influence
- 2 = leader has minimal influence
- 3 = leader has a fair degree of influence
- 4 = leader has a large degree of influence
- 5 = leader significantly and consistently influences constituency

OTHER INFORMATION

1. Are there, or have there been in the past, any rules concerning harvesting or resource conservation?
2. Are the rules restricted to a) an area or region? b) a particular species? c) use of a particular gear? d) certain recreational activities? e) other?(specify).
3. If yes, how long (was or has been) the system in effect?
4. Is there written legislation or are the rules based on an informal agreement?
5. Is there or was there a group or leader to manage and enforce these rights?
6. How would they be punished?
7. What is the level of compliance (are violations frequent)?

LOCAL POLITICAL ORGANIZATION

1. Describe local formal political organization.
2. Describe local techniques (formal and informal) for conflict resolution.
3. Can you map the boundaries of local political units?
4. How do you describe the quality of local leadership in terms of concern with fishery resources?

Appendix 1.3

FISHERMEN'S SURVEY FORM

Name:

Gender:

Fishery specialized in:

TRIP INFORMATION

Please tick appropriate box

One Year Before Project		After Project	
Duration of Trip	Whole day ()	Duration of Trip	Whole day ()
	³ / ₄ Day ()		³ / ₄ Day ()
	¹ / ₂ Day ()		¹ / ₂ Day ()
	¹ / ₂ Day ()		¹ / ₂ Day ()
Fishing Area	Reef crest ()	Fishing Area	Reef crest ()
	Blue holes/Lagoon ()		Blue holes/Lagoon ()
	Home reef ()		Home reef ()
	Passage ()		Passage ()
	Outside reef ()		Outside reef ()
Catch for the trip (Heaps/F and Kg/M Fishers)		Catch for the trip (Heaps/F and Kg/M Fishers)	
Price per unit		Price per unit	

MARKET FOR CATCH

Korolevu store: _____ %

Hotels: _____ %

Community: _____ %

Roadside: _____ %

Remarks:

Appendix 5.1

MARINE RESOURCE MANAGEMENT PLAN FOR KOROLEVU-I-WAI, NOVEMBER 5-7, 2002.

IDENTIFIED PROBLEMS	PROPOSED SOLUTIONS		WHO IS RESPONSIBLE FOR THE TASKS?		WHEN ARE THE TASKS TO BE IMPLEMENTED
	What has been done about the problem? Na cava sa qaravi ofi	Proposed Tasks to resolve the problem	Within the tikina of korolevu-iwai	From outside of the tikina of Korolevu-I-wai	
Non-compliance to conservation resolutions	Reafforestation on shorelines "coast care"	Awareness programs on conservation of marine resources.	Chief Workshop participants Environment committee	Fijian Affairs Board Provincial office FL MMA	Village meeting in November, 2002.
	Collection of rubbish from seashores (Resort and communities).	Environment Committee of Korolevu-i-Wai	Ratu Timoci Village Headman Committee member for Youth		At end of workshop on Nov. 7 after creation of environment committee
	Rubbish clearing from the sea "Earth Day"	Map out boundaries of fishing area for subsistence and 'reserve area'.	Environment Committee	Fisheries (to provide map)	
	Dig a big proper rubbish pit for the village				
	Declaration of Marine Reserve Area				

Destruction of Reef	Nothing has been done about this	Awareness campaign about the coral destruction is not beneficial to the community.	Workshop Participants Environment Committee	Fisheries Bogiva (FAB – Research Unit). OISCA	December 2002
Sewage (polluted water)	Has been monitored	Trial on “composting toilet” and proper * Waste management practices * Loading truck * Sewage line * Treatment Plant Awareness	Environment Committee Tikina Meeting “Bose Vanua”	Health (OHS) Environment, EIA IAS/USP FLMMA Asst. Roko Baravi Tourism	7/11/02 December and Quarterly
Rubbish dumping on seashore (plastic/iron)	Rubbish clean up on seashore (Resort and communities) Dig a proper rubbish pit	Environment Committee Tikina Korolevu-i-Wai Awareness of different types of rubbish Student Nurse scheme (Incinerator)	Ratu Timoci Turaga ni koro Committee member for Youth Environment Committee Village and Tikina meetings Nolevu Vulowai	Health Environment IAS/USP Tourism FLMMA Asst. Roko Baravi	At end of workshop 7/11/02 December And Quarterly

Burning	Regulation on indiscriminate burning in place	Awareness campaign on bad effects of burning Ban burning	Environment Committee Village and Tikina meetings	Forestry FLMMA Asst. Roko Baravi Tourism	7/11/02 December and Quarterly
Breaking the Law	Raised during village and tikina meetings	Raise this issue again in the next village and tikina meetings Select and train “fish wardens” for Korolevu-i-Wai Penalize and strengthen the village regulation Awareness training on regulations on protecting natural resources.	Environment Committee Workshop Participants Selection from the village and tikina council meetings Chief Turaga ni koro	Fisheries Resort Fisheries – awareness on proper use of gear when out on the reef FLMMA Roko Tui Yasana	Before end of 2002 First quarter of 2003 and on a quarterly basis
Duva	Use of ‘duva’ has been banned in a village meeting	Fish wardens to strictly enforce law and resolution by the village council	Fish Wardens Environment Committee Chief	Fisheries Provincial Office	1/02/2003

Coral Harvesting	It has been banned by both the village and tikina councils	Look at other sources of income— organic farm Eco-tourism (Backpackers)	Environment Committee “Bose ni tikina”	Landuse Unit (Agriculture) Affirmative Tourism Venture Capital Forestry FLMMA Asst. Roko Baravi	7/11/02 December And Quarterly
		Place a ban on overseas market for coral	Chief of the Yavusa to refuse any such requests for coral harvesting	Fisheries not to issue any coral export licence	First quarter 2003
		Monitor and take stock of all living things on the reef	Fish Wardens Fishermen	FLMMA	First Quarter 2003
		Environment Committee to communicate the implications of coral harvesting on other marine biodiversity	Fish Wardens Fishermen	FLMMA	First Quarter 2003

Lack of awareness of the vulnerability of our natural resources	Learn about coral Learn about a healthy lifestyle Learn and acquire skills in marine conservation methods (5-7 Nov, 2003) Lack of awareness	Workshops to be conducted in villages To start at school level	Yavusa Chief Turaga ni koro Environment Committee Village elders and village chiefs	FLMMA Fisheries FAB Health Environment T/ Saravanua	December and Annually
Small Fishing Nets		Awareness workshop	Yavusa Chief Tikina Council Representative Turaga ni koro Village elders	Fisheries FAB	Within the next 6 months and monitored annually
Overfishing	Have put aside reserve marine areas for Namada, Tagage and Votua	To be gazetted by government Fishing ground demarcation Selection of committee and fish wardens Monitoring of marine reserve areas	Village and Tikina Council meetings and “Bose Vanua”	Provincial Council Meeting Native Lands Commission Fisheries FAB	Within 6 months and to be monitored annually

Appendix 5.2

THREAT REDUCTION ASSESMENT SHEET

THREATS		CRITERIA RANKINGS			TOTAL RANKING	% THREAT REDUCTION	RAW SCORE
		ARE A	INTENSITY	URGENCY			
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
TOTAL							



TRA INDEX FORMULA	TOTAL RAW SCORE		TOTAL RANKING	=	COVERT TO %			TRA INDEX
TRA INDEX CALCULATION		/		=		X	=	