

Livelihoods and Customary Marine Resource Management Under Customary Marine Tenure: Case Studies in the Solomon Islands

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In many ways, coastal marine resources have provided an important source of protein, income and even employment for coastal rural Solomon Islands communities. Fishing, for instance, has always played a very important role in these communities' culture and tradition. Subsistence fishing is traditional in most rural coastal communities. Small-scale fishing is also wide-spread. Traditionally marine areas and resources were managed by the custodians of the adjacent land and the traditional leaders in some local communities. While small-scale fisheries are managed by the Government, much of the enforcement responsibility is in the hands of the community leaders, given the realities of what that Government can provide.

This research has explored the interaction between rural coastal livelihoods and marine resource management under Customary Marine Tenure (CMT) in one area of Temotu Province, Solomon Islands. Specifically the research seeks to explore, explain and describe how the livelihoods of the rural coastal villagers influence the use, access and management of marine resources and vice versa. Particular attention has been given to: first exploring the traditional marine resource management under CMT and livelihoods in the three villages; second, how the changes in the villagers' livelihoods system affects the customary marine resource management in the three case study villages; third, how changes in customary marine resource management influences the livelihoods of the villagers and finally the nature of the relationship between livelihoods and customary marine resource management is described for the first time for this part of the Solomon Islands.

The research results showed that villagers' livelihoods have changed over the past decade and much of these changes have affected the customary marine resource management in the three case study villages. Consequently, customary marine resource management under CMT is no longer effective. The changes in customary marine resource also have implications on the villagers' livelihoods. For this reason the study argues that when trying to understand the factors affecting customary marine resource, the entire livelihoods system of the people should be considered. The study states that the nature of the interactions between livelihoods and customary marine resource management is a two-way relationship, dynamic and very complex. Should there be further marine resource development, the study suggests that understanding the livelihoods of the people concerned is important for better management.

Key words: Livelihoods, marine resources, customary marine resource management, customary marine tenure, fishing, Temotu Province, Solomon Islands.

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List of Acronyms

CMT = Customary marine tenure

EG = Ecumenical Group

FAO = Food and Agriculture Organization

FSPI = Foundation of the Peoples' of the South Pacific International

IDS = Institute for Development Studies

MFMR = Ministry of Fisheries and Marine Resources

NZAID = New Zealand Agency for International Development

PFNet = People First Network

PWC = Provincial Women's Centre

RAMSI = Regional Assistance Mission to Solomon Islands

RCDF = Rural Constituency Development Fund

SLA = Sustainable Livelihoods Approach

SPC = South Pacific Community

UNCLOS = United Nations Conference of the Law of the Sea

VATUD = Vanikoro, Anuta, Tikopia, Utupua, Duff

Chapter 1: Introduction

1.1 An overview of the study

The search for sustainable development has highlighted the importance of understanding traditional resource management systems and their evolution over time and space. This global perspective has provided the basis for this research.

Many studies in the South Pacific have focussed on factors that have affected customary marine resource management under customary marine tenure (CMT), but there is little discussion that specifically focuses on the interaction between livelihoods and customary marine resource management regime under a CMT arrangement.

This research employs a case study approach under the qualitative, inductive genre. It seeks to explore, explain and describe the interactions and relationships between rural coastal livelihoods and marine resource management under CMT in three case study villages of the Santa Cruz Islands of Temotu Province, Solomon Islands. Specifically, the research seeks to explain and describe how the changes in the villagers' livelihoods affect the way rural coastal village people use, access and manage marine resources and vice versa. Particular attention has been given to (1) exploring the state of traditional marine resource management under CMT and livelihoods in the three villages, (2) how the changes in the villagers' livelihoods system affect the customary marine resource management in the three case study villages, (3) how changes in customary marine resource management influence the livelihoods of the villagers, and (4) describing the nature of the relationship between livelihoods and customary marine resource management.

The Sustainable Livelihoods Approach (SLA) has formed the key part of this study's research approach and process by providing an analytical framework against which to question the village research participants about the phenomena under study. The Sustainable Livelihoods Framework is a useful lens with which to identify the components comprising rural livelihood systems so that they can be more easily examined. It recognises the diversity of livelihoods and livelihood strategies, and also the importance of sustainability. This is complemented by other discourses in order to weave a backdrop against which the research is carried out, and to inform the choice of methods. Threads were drawn from gender and development theories and Kaupapa Maori Research (KMR).

1.2 Research aim and questions

The main aim of the research is to gain insights and understanding into the nature of the interactions and relationships between rural coastal livelihoods and marine resource management under CMT arrangements.

In particular, the research seeks to:

- Explore the state of traditional marine resource management under CMT and livelihoods in the three villages;
- Identify how the changes in the villagers' livelihoods system affect the customary marine resource management in the three case study villages;
- Identify how the changes in customary marine resource management influence the livelihoods of the villagers; and
- Describe the nature of the relationship between livelihoods and customary marine resource.

The main research question posed is: What is the nature of the interaction and relationship between rural coastal livelihoods and coastal marine resource management under the present CMT arrangements? The lower level research questions are:

- 1) What is the state of traditional marine resource management under CMT and livelihoods in the three villages?
- 2) How do the changes in the villagers' livelihoods system affect the customary marine resource management in the three case study villages?
- 3) How do the changes in customary marine resource management influence the livelihoods of the villagers?
- 4) What is the nature of the relationship between livelihoods and customary marine resource management?

1.3 Problems, issues and justification for the study

The impetus for this research is sixfold:

- 1) While a country is going through an economic downturn, its rural communities tend to depend heavily on their natural resources (such as marine resources) as a source of food and money. For a province like Temotu that is isolated geographically and economically, this is a predominant reality for all the rural communities. Subsistence and small-scale fisheries provide a potential rural livelihood strategy for rural coastal communities. Despite increase modernisation, marine resources may still be managed traditionally under CMT. The changes in population, coupled with other factors, are potential threats to marine resources and customary marine resource management under CMT. For this reason, there is a need to understand the nature of the relationship between the management of the coastal marine resources and the livelihoods of the coastal rural communities in order to develop ways to mitigate the adverse impacts and also opt for alternative management regimes.
- 2) There is a general perception that customary marine resource management works reasonably well in the Solomon Islands context. However, this perception should be researched given temporal considerations. This study, therefore, should shed some light on such a perception and make positive contributions in this respect. Moreover, the study will contribute to a better

understanding of the traditionally-based marine resource management in terms of its effectiveness in managing the marine resources at the community level. Given the fact that 90 percent of the Solomon Islands population live in rural coastal areas and largely depend on marine resources for their livelihoods, this study should contribute to the sustainable management of the coastal fishery, particularly subsistence and small-scale fisheries.

- 3) There is a lack of studies on coastal rural livelihoods and traditional management of coastal marine resources at the community level in Solomon Islands. The dearth of studies is especially profound in Temotu Province. Even though other parts of the Solomon Islands may have been studied, exploring the rural livelihoods of the Santa Cruz communities is justified because each area is different. In fact, there is no known research on Temotu Province, so little is known about their livelihoods and marine resource management arrangements. This study should bridge that gap.
- 4) Should the Government wish to implement a partnership approach to marine resource management in the Solomon Islands, an understanding of the interactions between coastal rural communities' livelihood and marine resource management is necessary. This is because one of the key stakeholders in partnership-based marine resource management are the rural communities. This is especially so in more remote regions like Temotu Province. CMT (see Chapter 4) is one of the essential elements of customary marine resource management that could provide a framework for the partnership-based management.
- 5) Sustainable management of coastal fisheries is of crucial importance in the light of the problems with the fishery and livelihoods of coastal communities, plus the needs of future generations. It is envisaged that this study would help policy makers and external agencies to develop policies for better sustainable marine resource management regimes, drawing on the concepts of CMT. This study is consistent with the Solomon Islands' national goals of sustainable natural resource management and its rural development strategy.
- 6) Efforts to manage marine resources have focussed largely on the marine resources. In addition, fisheries managers often believe that the main obstacle to effective action is ignorance of resources dynamics, and so have paid little attention to the livelihoods aspect of the people concerned. This study intends to highlight the significance of the villagers' livelihoods in marine resource management.

1.4 Researcher's interests

I have a genuine concern and interest in participating in the development of Temotu Province and the rest of the Solomon Islands. In this regard, I hope that this research would help the people from

Temotu Province to realise the importance of marine resource management for their sustainable rural livelihoods and development. Importantly, I wish to help the villagers understand the implications of the management of marine resources on their livelihoods, and the implications of their fast changing livelihoods on marine resource management, especially the customary marine resource management under CMT.

I am from the Santa Cruz Islands, and have been motivated to conduct the research in my place of origin for the reasons mentioned above.

1.5 Structure of thesis

Following this introductory chapter, the eight remaining chapters are organised as follows:

Chapter 2 sets a brief bio-physical and socio-economic context of the study. The focus is on Temotu Province, in particular, the island of Santa Cruz where the three case study villages of Venga, Neo and Graciosa Bay are located.

Chapter 3 discusses the background on the status of coastal marine resources, their utilization and management issues in the Solomon Islands. Particular attention is given to Temotu Province. The coastal marine resources refer to nearshore marine resources contained near the shoreline and reefs. It does not include offshore marine resources, which are mainly concerned with deep sea fisheries. Utilization relate to subsistence and small-scale (artisanal) fisheries. Management relating to coastal marine resources at the government, provincial and village levels is discussed. The treatment is in terms of the linkages between these three levels, current management issues, and prospects for management in the future.

The thrust of Chapter 4 is the theoretical context. Firstly, the chapter presents the relevant concepts and studies relating to customary marine resource management under CMT. Specifically, definitions, concepts, various traditional marine resource management practices used, significance of traditional beliefs and knowledge, and factors influencing marine tenure in the Solomon Islands are discussed. The centrally-based and partnership-based (co-management) regimes are briefly discussed. Secondly, the Sustainable Livelihoods Framework is described, and its importance in relation to marine resource management is discussed.

Chapter 5 outlines the research methodology. The research approach, strategy and methods of data collection and analysis employed in the study are presented. The research design and research field procedures (protocol) are also discussed, including the sampling and triangulation strategies. Constraints encountered during fieldwork and ethical considerations are also discussed.

Chapters 6 and 7 complement each other. Chapter 6 presents the past context of the three case study village livelihood systems, fishing activities, marine resources and traditional management under CMT. Chapter 7 presents the village livelihoods and customary marine resource management changes that have taken place over the recent decades.

Chapter 8 provides a discussion on the results presented in Chapters 6 and 7 against relevant literature. There are four parts to this chapter. The first part highlights the state of the villagers' livelihoods and the customary marine resource management in the three villages. Then the principle elements of customary marine resource management are identified and discussed. This is followed by a discussion on how livelihoods and customary marine resource management influence each other.

Chapter 9 draws together the conclusions from the research findings in the thesis. Specifically, the conclusions highlight the answers to the research questions as presented in Section 1.2 above. The chapter also provides lessons learned from the study, recommendations and policy implications of the research findings together with suggestions for further research.

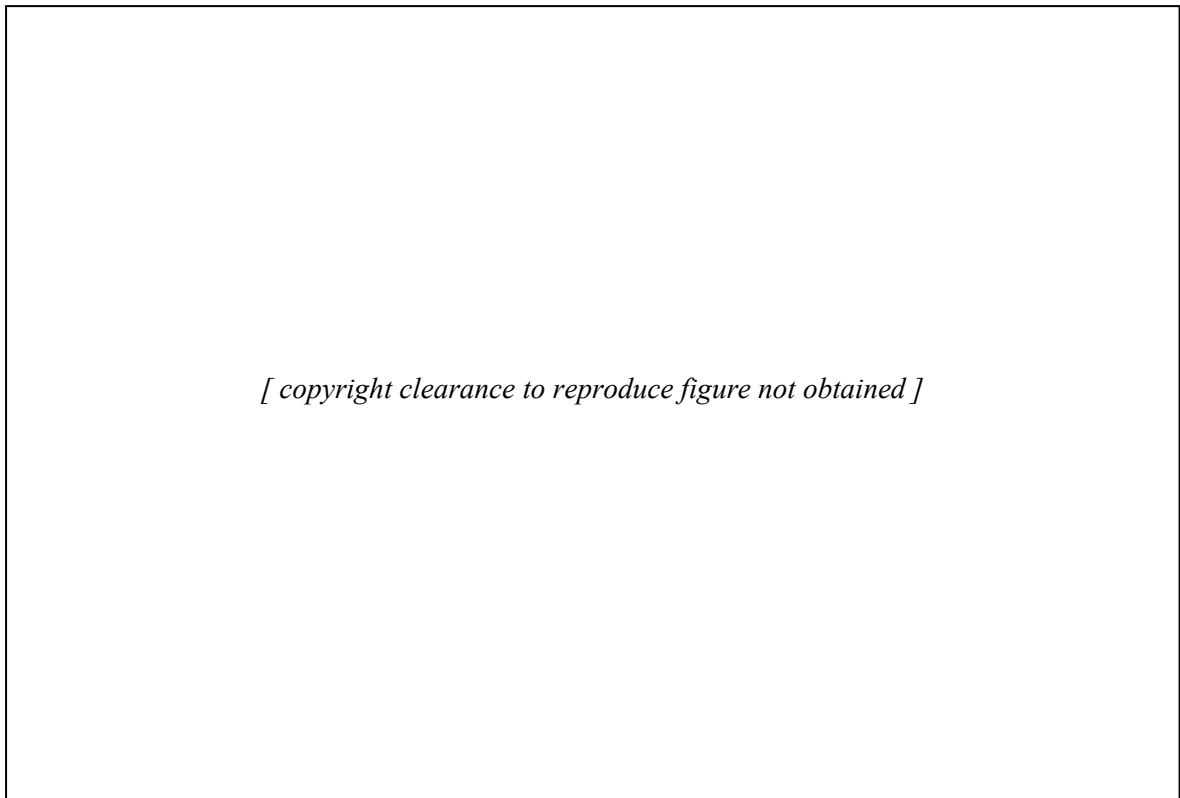
Chapter 2: The Study Setting: Physical and Human

2.1 Introduction

This chapter presents the physical, human and economic setting for the study. The focus is on Temotu Province and in particular the island of Santa Cruz where the three case study villages of Venga, Neo and Graciosa Bay are located.

2.2 The Physical Setting

2.2.1 Location, topography and climate



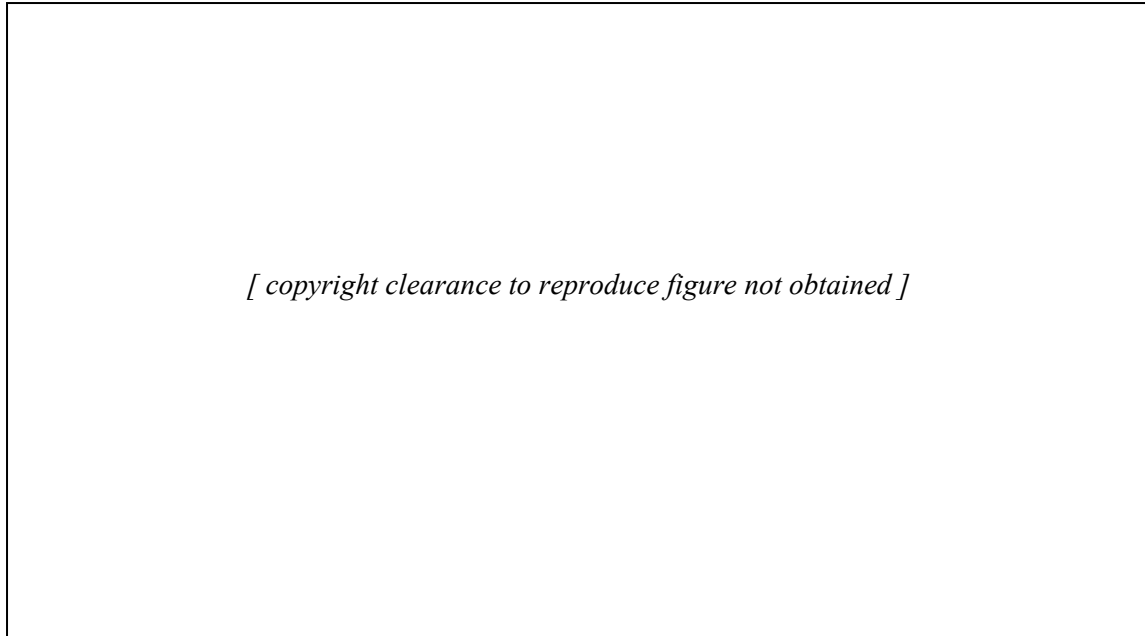
(Source: Wikipedia 2007)

Figure 1: Map of the Solomon Islands

Location and topography

Geographically, the Solomon Islands is located between longitude 155⁰ - 170⁰ E and between approximately 5⁰- 12⁰ S, some 1900km from the east coast of Australia. The nearest islands are Vanuatu, Fiji and Papua New Guinea. The Solomon Islands has a land area of approximately 27,556 square kilometres and an ocean area of 1,340,000 square kilometres (Hviding 1989). The coast line of the Solomon Islands is 5,313 kilometres. The Solomon Islands consists of over 900 islands widely dispersed over this vast ocean area. The country consists of two roughly parallel island chains with seven main islands, as shown in Figure 1 above.

The Islands are administratively divided into nine Provinces: Guadalcanal, Malaita, Isabel, Makira, Central, Rennell and Bellona, and Temotu Province. The capital, Honiara, is located in Guadalcanal Province. As the case study villages are in the Temotu Province, a description of Temotu Province including its location and topography is given below.



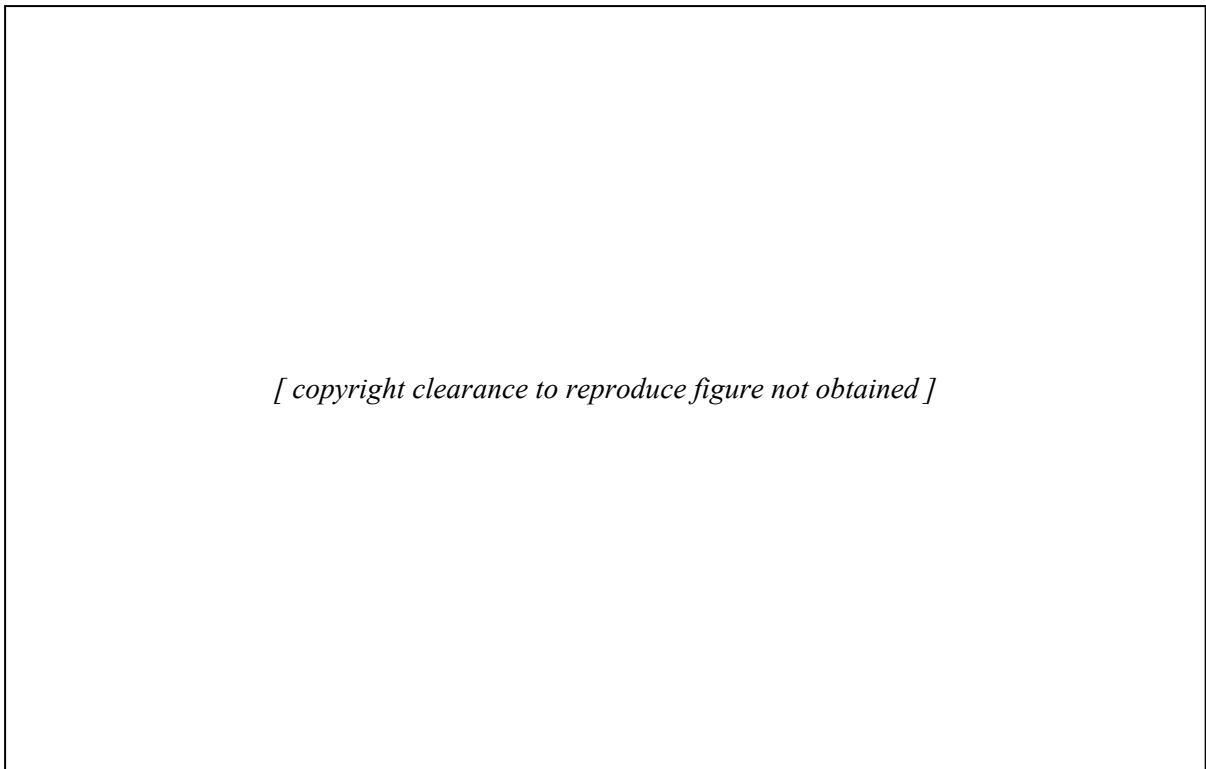
(Source: Wikipedia 2007)

Figure 2: Map of Temotu Province

Temotu is the most eastern province of the Solomon Islands (Figure 1). It consists of a crescent shaped chain of islands. It has a land area of 895 km², consisting of seven main groups of islands which are scattered over a huge ocean area as shown in Figure 2. The islands vary in size and type. Some are big while others are small. Others are low-lying atolls and volcanic. The bigger Islands are Nende, Utupua and Vanikoro. They are covered with forests and mountains and have rivers. There are also numerous inhabited beautiful smaller islands around these islands. The small islands are basically low-lying atolls, especially the Reef Island group, Duff, Anuta, and Fatutaka. Salination is becoming a real threat to some small islands of the Reef Islands group. This is due to the rise in sea level. The Islands with volcanic origins are Tikopia and Tenakula. They have very fertile soil with green vegetation. Tenakula is an active volcano, located some kilometres north of the Santa Cruz Islands. The island's coastal belts are often lined with coconut plantations and ringed by reefs. Earth tremors are quite frequent in the Temotu Province (Wikipedia 2007).

The Santa Cruz Island group is the largest in Temotu Province and comprises three large islands (Nendo, Termotu Neo and Termotu Noi) and several uninhabited islands along its coast. Nendo being the biggest island is 40 km long and 22 km wide. Its land area is 505.5 km². The highest point on the island is 549m above the sea level (Wikipedia 2007). The Provincial capital, Lata, is located on Nendo

Island. The fact that the Santa Cruz Island group is the largest island where the provincial capital is located gives it more significance.



(Source: Wikipedia 2007)

Figure 3: Map of Santa Cruz group of islands in Temotu Province

Climate

The climate of Temotu Province and generally for Solomon Islands as a whole is extremely humid throughout the year, with a mean temperature of 27°C and few extremes of temperature and weather. The months of June through to August are the cooler period. Although seasons are not pronounced, the northerly winds of November through April bring more frequent rainfall and occasional cyclones. Temotu Province is very vulnerable to cyclones. Since the early 1990s ten cyclones have affected the Province, with cyclone Nina in 1993 being the worst. The Southwest Islands such as Tikopia, Anuta and Fatutaka more frequently encounter cyclones than the other islands. The cyclones have had devastating impacts on the natural vegetations of the islands and the Provincial economy. The annual rainfall is about 305 centimetres (Wikipedia 2007).

2.2.1 The case study village settings

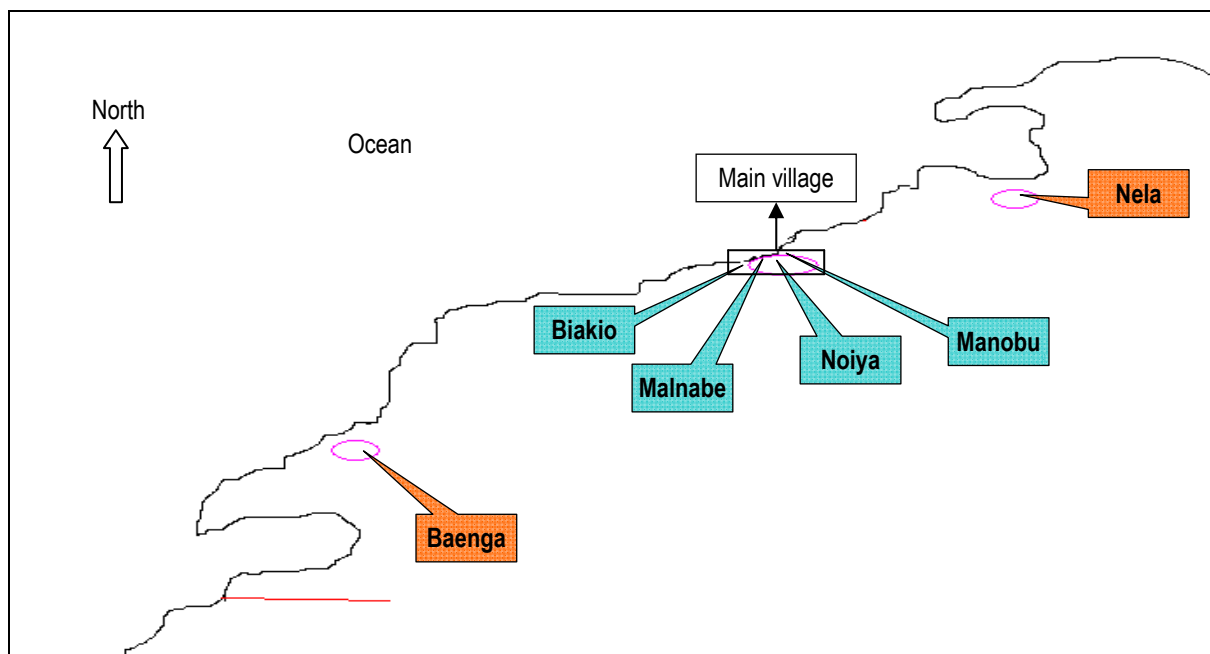
The physical setting of the three case study villages significantly differ from each other. There is scant literature on Santa Cruz Islands. Consequently, much of the descriptions come from the interviews conducted and personal observations.

Venga village

Venga village is located on the West coast of Santa Cruz Island, as shown in Figure 3. The village is located between Nemba village and the provincial headquarters, Lata. It is approximately one and a half kilometres southwest of Lata. The village is located on the sea shore and is approximately 300 metres long (along the coastline) and 150 metres wide stretching inland. The marine coastline within the geographical boundaries of Venga village covers a distance of approximately 3 kilometres. The seashore is mainly sandy with few rocky areas and covered with coconut plantations.

Venga village is made up of one main village, usually referred to as “Venga” and two outlying sub-villages of Nela and Baenga (Figure 4). Nela is approximately one kilometre east from the main village. Baenga is approximately 1.5 km away on the western side of the main village. I observed newly established hamlets around Nela and Baenga sub-villages. According to AKIM¹, these and possibly the surrounding hamlets were established due to lack of space to build houses in the main village in the face of an increase in population. I also discovered that families chose to leave the main village and live on their own in the outlying hamlets and sub-villages.

The main village is made up of four sub-villages. They are Manobu, Noiya, Malnabe and Biakio (location from east to west). Inhabitants of each of the four sub-village areas belong to clans which constitute the tribe. They are referred to as “same rope or generation of people” (nui lir or neidulir noblo ke’esa).



(Note: Map drawn by Author. Not to scale)

Figure 4: Location of sub-villages of Venga village

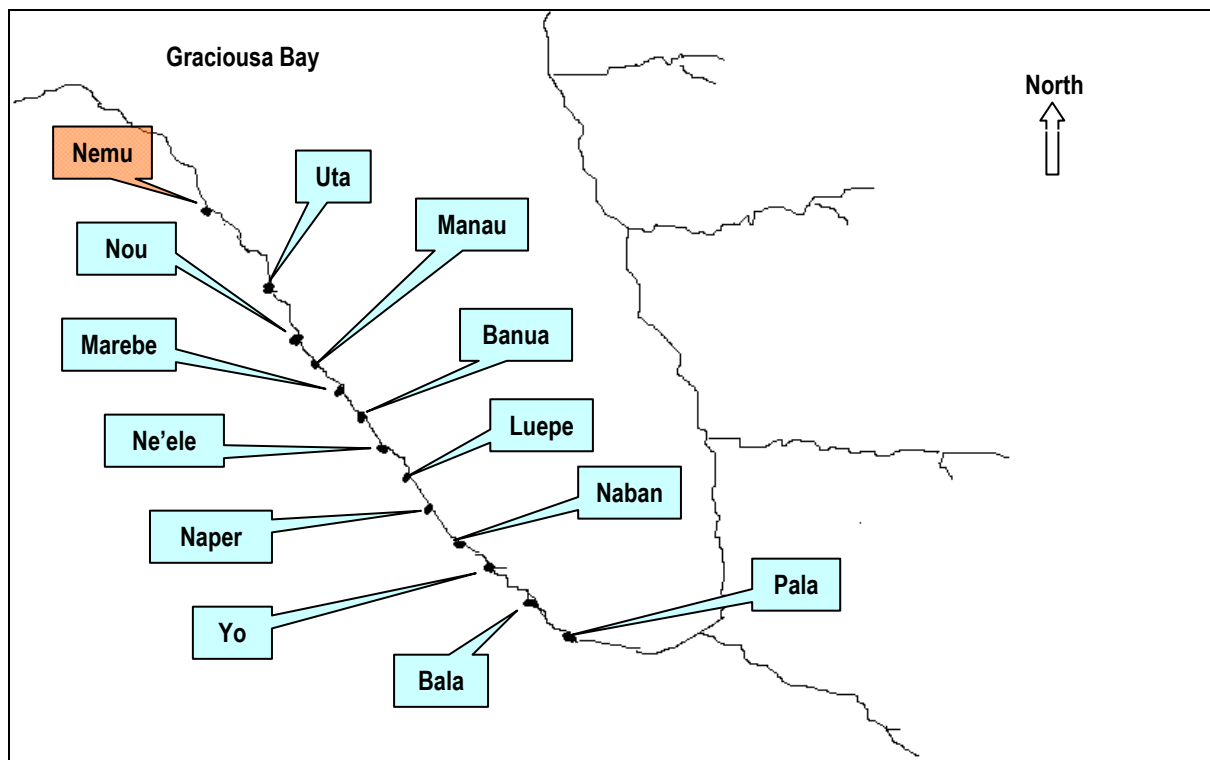
¹ Interviews were done with the research participants. Pseudonyms are used to represent them (see Chapter 5, section 5.11 for details). The interviews were conducted between April and June 2007.

According to AKIM, Venga village has a long history to becoming a unified village: “*In the distant past, there were a number of little hamlets, for instance, Sapir, Noyakerbau, Naluker, Nowe, Nela and Venga (which became the main village) that were scattered along the coast of Vengan boundary. They used to be separated by big forest but joined by tracks along the coast. Through traditional warfares and health epidemics people have caused people to live together. Venga village was expanded in size, however, during those days the sub-village areas were separated by boundaries either in the form of stone walls or landmarks*”. Another AMO1 said that due to Christianity in the late 1500s and the modern form of government people removed the boundaries and regarded the villages as one.

Graciosa Bay

Graciosa Bay, traditionally known as Nabakaenga, is located along the Graciosa Bay, from which it got its name (Figure 3). It is 1.5 km southeast of Lata. The village is located right on the seashore and is approximately 5 km long and 100-150 metres wide from the coast to the hinterland. Its coastline covers a distance of approximately 5.5 kilometres. Graciosa Bay seashore is mainly rocky with few scattered sand beaches along its coastline. It is the longest village in the Santa Cruz Islands group.

The village of Graciosa Bay comprises 12 sub-villages (Figure 5) which together make up the main village, and a few outlying settlements. Nemu is the main outlying settlement, although some houses are scattered between Lata and the main village. While in the past the main sub-village areas were separated by bush and some by village cemeteries, today they have joined together due to more houses being built as a result of expansion in the population base.

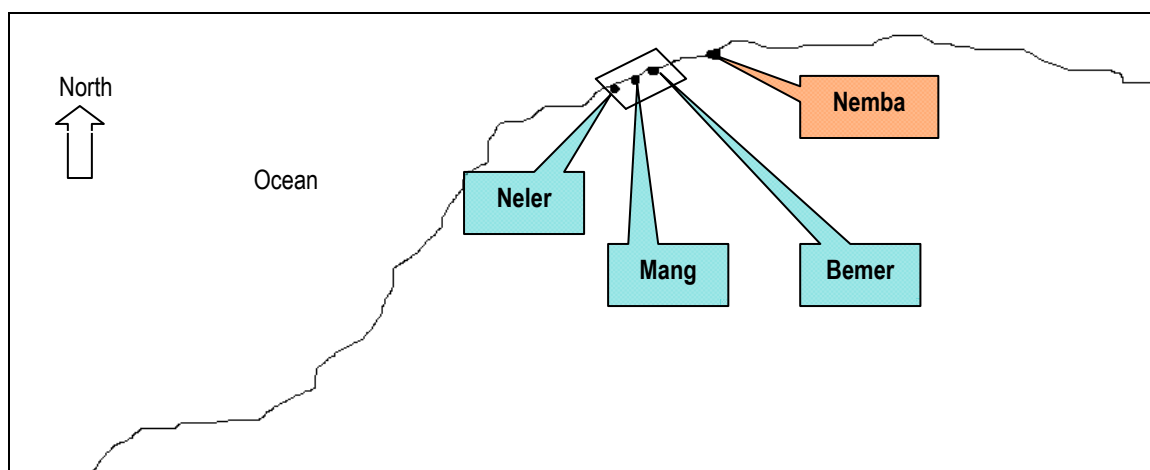


(Note: Map drawn by Author. Not to scale.)

Figure 5: Location of sub-villages of Graciosa Bay

Neo village

Neo village is located on the North Coast of Termotu Neo Island (Figure 3). This island lies one kilometre north of Nendo Island. Neo village is about thirty to forty minutes by 15 Horse Power outboard motor to Nendo Island. Villagers sometimes walk to the southern villages and get on a boat. Neo's coastline stretches over about 2.5 km and is mainly rocky with very few beaches. The main village is made up of three sub-villages and an outlying sub-village of Nemba (Figure 6). Each of the sub-villages is further sub-divided into smaller village areas.



(Note: Map drawn by Author. Not to scale.)

Figure 6: Location of sub-villages of Neo

Summary of the three case study villages

In summary, the three case study villages each comprise between three and twelve sub-villages lying along their respective shores from up to 5 km with only Neo having a gap (40 m) between it and the shore. Table 1 below provides the summary of the physical features of the three case study villages. Each of the case study villages has nearshore reefs extending and adjoining the length of its shorelines. As is discussed later, each village also has offshore reefs.

Table 1: Case study villages' summary

	Venga	Graciousa Bay	Neo
Village location	Main island-Nende	Main island-Nende	Island-Termotu Neo
Village distance from seashore	Coast (0 m)	Coast (0 m)	Coast (40 m)
Village seashore main feature	Mostly sandy	Mostly rocky	Rocky
Length (L) and width (W) of village reef (approx.)	L: 3 km W: 100 m	L: 5 km W: 50 m	L: 2.5 km W: 50 m
Length and width of the main village	L: 300 m W: 150 m	L: 5 km W: 150 m	L: 400 m W: 200 m
Number of sub villages	4 with 2 outlying sub-villages	12 with few settlements	3 with one outlying sub-village and few settlements

2.3 The human setting

2.3.1 Socio-demographic characteristics

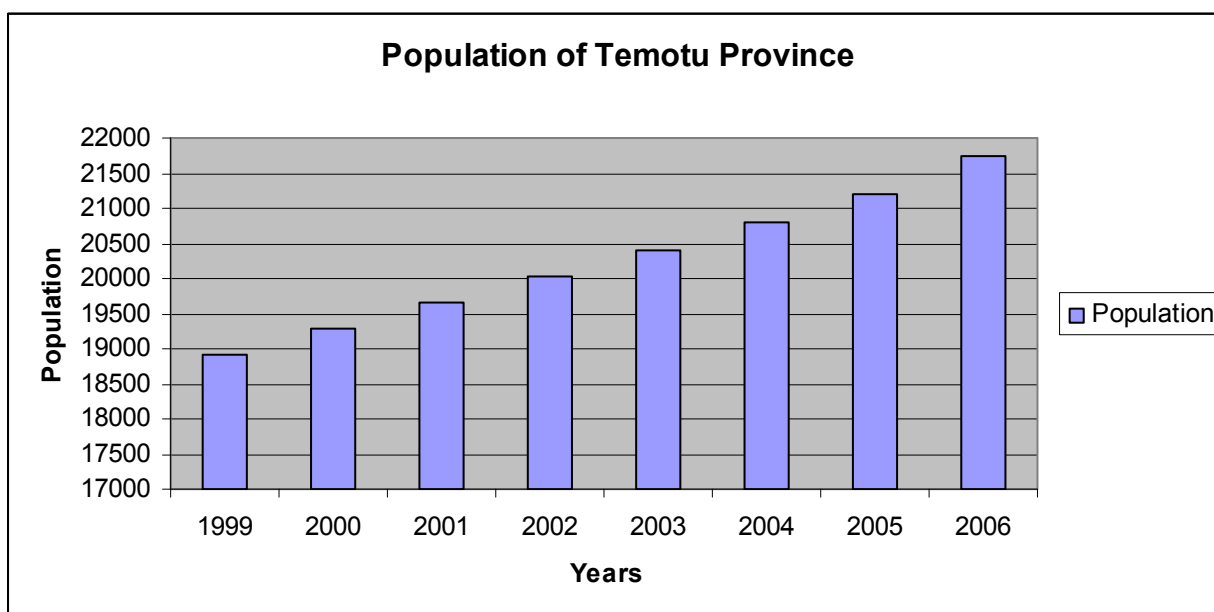
A brief description of Temotu Province is provided under this section. The focus is on Nendo Island and the three Case Study villages.

Provincial level

The population of Temotu Province has increased over the past years. In 2007, the population of Temotu Province was 21, 786 with a growth rate of 2% (Table 2, Figure 7). The population of Temotu Province is approximately 4.4% of the estimated population (495,026) of the Solomon Islands in 2007 (National Statistical Office 2007). In 1999, the population density of Temotu Province was 21.1 persons/km². The population density has continued to increase, corresponding to the increase in the population base of Temotu Province over the recent years.

Table 2: Population of Temotu Province 1999-2006

	Population of Temotu Province							
Year	1999	2000	2001	2002	2003	2004	2005	2006
Population	18,912	19,275	19,645	20,019	20,407	20,794	21,191	21,757
Density	21.1	21.5	21.9	22.4	22.8	23.2	23.7	24.3



(Source: Data supplied by the Provincial Medical Division, Temotu Province, 2007)

Figure 7: Population growth of Temotu Province, 1999-2006

About 90% of the population of Temotu Province live in rural villages. Most people live in small to big coastal villages. These villages are scattered around the coastal areas of the Islands. There are very few inland populations on the main islands and they maintain links to nearby coastal areas.

The population of the Santa Cruz Islands in 2007 is not available. However, according to the Provincial Medical Division (2007), the population of Nendo in 2006 was 10,038. The approximate population of the three case study villages were 1100, 1200, and 1500 for the villages of Venga, Graciosa Bay and Neo, respectively (Provincial Medical Division 2007). While the population density of Nendo is unknown, from personal observations, of the three case study villages the population density is higher for Neo and Graciosa Bay than for Venga.

2.3.2 The social setting

This section provides a description of the social setting of the Temotu Province. Particular attention is placed on Santa Cruz Islands where the case studies are located.

Ethnic groups

There two are ethnic groups of people that occupy the Province, the Melanesians and the Polynesians. The Melanesians are predominant in Nendo and some parts of the Reef Islands. The three Case study villages in the Santa Cruz Islands are ethnically Melanesians. The inhabitants of Tikopia, Anuta, the Duff Islands and some of the Reef Islands are Polynesians. Due to intermarriage, migrations and land purchases, many Polynesians and some Reef Islanders have come to settle in some parts of Santa Cruz Islands. For example, the inhabitants of the volcanic island of Tinakula were resettled in Menevi on Temotu Neo Island of the Santa Cruz Island group when the volcano erupted around the 1840s. Many people from Reef Island and Tikopians have settled near Lata, towards the Vengan village land boundaries. Many migrants from the Reef and Duff Islands are occupying many parts of the eastern coast of Nendo Island.

Since Temotu Province is made up of two ethnic groups, it has many cultures and languages. The predominant characteristics of the traditional Melanesian social culture include: a subsistence economy where a barter system is practiced; the recognition of bonds based on kinship with important obligations extending beyond the immediate family group; acquired rather than inherited social status; and strong attachments of people to the land and the sea. Most of the people of Temotu Province maintain this social structure and find their roots in village life. Much of the Melanesian social structure has changed over the recent decades due to external factors such as exposure to western ways of life.

There are eight vernacular languages spoken by the people of Temotu Province. Natungu is the language spoken by the people of Santa Cruz. Dialectical differences are evident between localities. Migration and intermarriage has caused some villages in Santa Cruz Islands to speak other languages such as those of the Reef Islands. The Tikopians, Anuta and the Fatutaka population speak a different

language. Duff Islanders and some of the Polynesians inhabiting some of the islands of the Reef Islands group also speak several different languages.

Christianity has been embraced by the entire population of Temotu Province. Most of the people are Anglicans. Other denominations include Seventh Day Adventist, Pentecostals, Jehovah's Witness, South Seas Evangelicals, and Catholic. Some portions of the population maintain some traditional beliefs.

The household

A village is made up of households and each household comprises family members. The household in the Santa Cruz Islands is both a unit of production (and reproduction) and consumption. It is also a site of cooperation and conflict and where decision-making relating to production and consumption such as that relating to livelihoods takes place. The household is a defined residential unit. Members of the residential unit include the members who are present and absent and members of the extended family who are living and performing domestic functions and activities together with the immediate family members.

The household is made up of a nucleus family of parents and children. The akinal relationships, together with affinal relationships between family members in a household define the underlying social relationships and structures and have implications for livelihoods and coastal marine resource utilization and conservation. Apart from nuclear families, extended families also exist within households. Extended family refers to a family which has other family members such as grand parents, nephews, niece, and cousins as part of the family. From personal observations and interviews, the case study villages exhibit characteristics of these two types of families. There are no official counts of the number of extended and nuclear families in the three case study villages.

Almost all marriages are monogamous. Polygamous marriages are culturally inappropriate. The father is normally the head of the family and the household. This is consistent with the fact that the Melanesian society is patrilineal and patriarchal. Children inherit land (including the sea) and other property through the father's line. In cases where the husband dies the mother (widow) becomes the leader of the household. If the children are small when their father dies, the widow may return to her parents or remain with her deceased husband's family. The mother may choose to stay with her children, if the children are big already. In this case, the elder son usually takes over as the head of the household from his deceased father. However, the widow's family maintains a relationship with their grandparents and uncles.

Organisation of labour within the household is determined by gender. The father usually makes the decisions concerning the tasks to be done regarding the productive aspects of the household, although

sometimes the mother and the father make the decisions jointly. Reproductive decisions pertaining to household chores (i.e. rearing children, cooking, washing clothes and plates, collecting firewood) are usually done by the wife. The children are expected to adhere to the parent's decisions and instructions.

2.3.3 Political organization

The Solomon Islands is part of the Commonwealth and operates under a Westminster-style of parliamentary democracy. Parliamentary representation is based on single-member constituencies from the nine Provinces. The national members of Parliament are elected by the people from their respective constituencies. Temotu Province has three constituencies, namely, Nende, Pele and VATUD. The Nende constituency comprises the Santa Cruz Islands. The Reef Islands group comes under the Pele constituency and the VATUD constituency covers the Duff islands, Vanikoro, Utupua, Tikopia, Anuta and Fatutaka.

The Prime Minister, elected by the Parliament, chooses the cabinet members. Each Ministry is headed by a Minister, who is assisted by a permanent secretary. Generally the Solomon Islands national government is characterized by weak political parties and highly unstable parliamentary coalitions. They are subject to frequent votes of no confidence, and government leadership changes. Corruption is also infiltrating the political system and is both endemic and systemic (Aqorau 2001).

The nine provinces are administered by elected provincial assemblies while the Honiara Town is administered by the Honiara Town Council. The Provinces have considerable autonomy in matters of self-government, including marine resource management (Food and Agricultural Organisation (FAO) 2004). The provincial members are elected by the villagers in the Ward they represent. In Temotu Province there are 15 Wards. Venga village is in Nevenema Ward, Graciosa Bay in Graciosa Bay Ward and Neo in Termotu Neo Ward.

In the past the area council represented the Provincial Government authority at the village level. The area council was appointed by the Provincial Government. They were very influential in effecting Government rules at the village. For example, they ensured that on "communal days" the entire villages were involved in communal tasks assigned for that day. The position of village Area Council representative was removed by the Government in the 1990s. Each village now adapts its own village leadership structures. For example, in the three case studies of Venga, Graciosa Bay and Neo, each show different arrangements which are presented in detail in Chapter 6. Currently the three case study villages have chiefs including village traditional leaders. These village Chiefs are elected by the villagers. The position of Chief is not hereditary, but based on the exhibition of certain qualities (that is, they are influential and knowledgeable about customs and good oratory skills). They are responsible for most of the matters concerning the village, including marine resource management.

The link between the national and the provincial government is formal and clearly defined. The link between the Provincial and village leadership structure is informal and not clearly defined.

2.3.4 Economic Setting

Temotu Province is one of the least developed Provinces in the Solomon Islands. The economy of Temotu Province comprises the large informal subsistence sector and the formal sector. The informal sector basically refers to the informal production activities which are subsistence related and for which a formal market is non-existent. An example of subsistence activity is subsistence fishing activities. Barter system is one of the main characteristics of Temotu Province's subsistence economy. About 80% of Temotu Province population are rural-based and largely engage in subsistence farming and fishing.

The formal economic sector refers to the economic productions that go through formal markets. The Provincial formal economy has a limited low value economic production base consisting of copra, cocoa, marine products (fish), logs, timber, coconut oil and rice. The scale of production is very small. Copra, cocoa and marine products are produced by the village people. Temotu Development Authority (TDA) is the local buyer of copra, cocoa and timber in Lata. It also produces coconut oil from copra at a plant on Nendo Island. TDA is owned by the Provincial Government. Price variations have caused many village copra and cocoa producers to sell their produce directly to buyers in Honiara. Logs are produced by a recent logging company operating in the province.

The Province also operates a shipping service using the vessel "MV Temotu". Unfortunately, it is currently facing managerial, financial and engineering problems that have affected its service. Solomon Airlines provides services which are unreliable and inefficient and not conducive for commercial purposes. There are only two flights per week. Freight costs are very expensive (20 kg allowable and \$20/kg for excess) and the planes serving the Province are small (15 seater Twin Otters).

Many of the rural people also harvest and sell marine products. This is discussed in detail in Chapter 3. The marine products include fin fisheries and non-fin fisheries which have commercial value. The Provincial Fisheries Extension Office buys fish, especially snapper, from rural fishermen and sends them directly to Honiara. The villagers harvest other commercial marine species, selling them directly to licensed local buyers. These buyers are not formally coordinated by the Fisheries Extension Office. Some Villagers sell their marine products to buyers in Honiara. These marine species include fish, bech-de-mer, shark fins and trochus. The information on the marine products is not readily available due to lack of proper data collection initiatives. For example, PFO expressed concern that the amount of marine products leaving the province to Honiara is not known as there are no records of them.

The Provincial economy not only has a small economic base but is also vulnerable to external shocks. This is due to the fact that the economy has limited capacity to withstand external factors impacting on its economy. For example, the producers of copra and cocoa are often faced with fluctuating market prices and very high costs of production. The unstable market price is a national issue as the country is a price taker at the world market. Moreover, Temotu Province is geographically far from Honiara where all the economic activities are centred. Cost of any economic production is usually high in Temotu Province because of the high wholesale and retail prices and high cost of transportation. Proper rural roads are lacking in most of the rural areas, even on the Santa Cruz Islands, making it even more difficult for remote villages to engage in sustainable economic activities. Other important infrastructure such as water supply and electricity are still major problems in the Province. Recent ethnic and political tensions in the Solomon Islands have also significantly affected the Provincial economy and it is still recovering very slowly. The Regional Assistance Mission to the Solomon Islands (RAMSI) has helped in restoring law and order throughout the country, including Temotu Province.

Marine resources development, especially fisheries development, is expected to play a significant part in the province's future prospects according to a Provincial Government Officer interviewed at Lata. The need to ensure appropriate marine resource management in the Province and at the village level is therefore necessary and important.

2.4 Chapter summary

The Solomon Islands consists of many islands widely dispersed over a vast ocean area. There are nine Provinces and the case study villages are in Temotu Province, the furthest province from the capital, Honiara. The three case study villages have a combined population of 3,800 which is approximately 40% of the Santa Cruz Islands group population. Santa Cruz Islands is the biggest group of Islands in the Province. Two of the case study villages (Venga and Graciosa Bay) are on Nendo, the largest island in the Santa Cruz Islands group. The other, Neo is on a nearby Island (Temotu Neo). All the villages are approximately within 5 km of the Province's capital, Lata. The climate in Temotu Province is characterised by high rainfall and sunshine. Cyclones are common.

The villages differ in their physical features and are located along and adjacent to the seashore. They are made up of households which in turn are made up of a family, either nuclear or extended. The population of Temotu Province has significantly increased over the past decades and Santa Cruz Islands has the highest population. The majority of the population live in the villages and live a subsistence coastal lifestyle.

The National Government is the highest body in the political structure of the study setting. This is followed by the Provincial Government and the village political structures at the village level. The

linkage between the national and the provincial government is clearly defined, but the linkage between village leadership and the Provincial Government is not clearly defined.

Temotu Province is one of the less developed provinces in the Solomon Islands. It has little economic production base and the economy is very vulnerable to external forces. Marine resources, especially fisheries development, are expected to play a key role in the Province's future prospects.

The background on the stature of marine resources, their utilisation and the policy aspects of management are presented in the next chapter.

Chapter 3: Background on the Status of Coastal Marine Resources, Utilization and Management in the Solomon Islands

3.1 Introduction

This chapter discusses the background on the status of coastal marine resources, utilization and management issues in the Solomon Islands. Particular attention is given to Temotu Province. The coastal marine resources refer to nearshore marine resources contained near the shoreline and reefs. It does not include offshore marine resources which are mainly concerned with deep sea fisheries. Utilization relates to the exploitation or use of subsistence and small-scale (artisanal) fisheries. Management relating to coastal marine resources at the government, provincial and village levels is discussed. The treatment is in terms of the linkages between these three levels, current management issues and prospects for management in the future.

A brief description of nearshore marine resources in the Solomon Islands at the national and provincial level is contained in section 3.2. The discussion at the provincial level (in this case Temotu Province) is very brief due to a dearth of extant literature.

The socio-economic, environmental and institutional factors affecting the status of coastal marine resources in the Solomon Islands are outlined in section 3.3. These factors are discussed at the national level because of lack of studies in Temotu Province.

Section 3.4 defines and discusses subsistence and small-scale fisheries in the Solomon Islands. This is followed by a discussion on the contribution of subsistence and small-scale fisheries to the livelihoods of rural coastal communities and also the provincial and national economies. The impacts of subsistence and small-scale fisheries activities on coastal marine resource management are discussed at the end of the section.

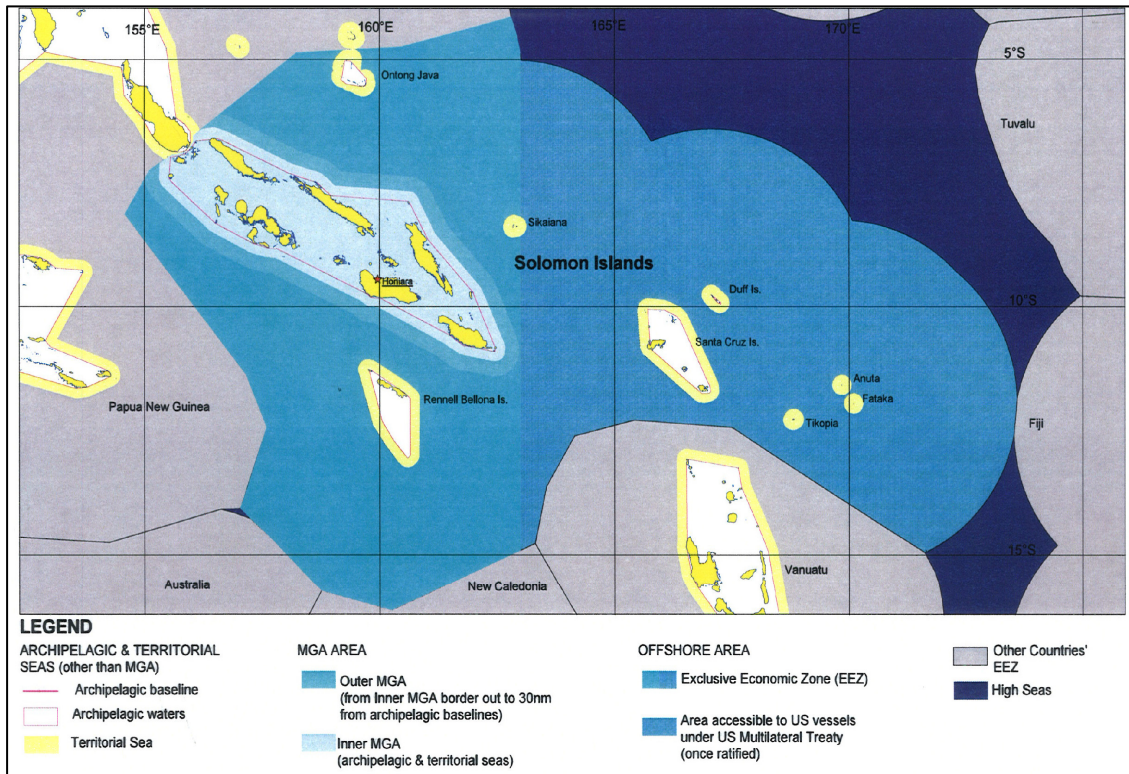
The linkages between the different Actors in the management of coastal marine resources in the Solomon Islands are presented in section 3.5. The policy perspectives on marine resource management in the Solomon Islands are contained in section 3.6, including institutional management issues that have arisen over the years. The prospects for marine resource management in the Solomon Islands are given in Section 3.7. Concluding remarks are contained in the chapter summary at the end in section 3.8.

3.2 A description of nearshore marine resources in the Solomon Islands

3.2.1 National level

Coastal marine resources lie within the territorial sea boundaries of the Solomon Islands (Figure 8). Throughout this thesis, “nearshore” is used to refer to sea areas close to the shore. This is

approximately 200 metres in Venga village and 50 metres for Graciosa Bay and Neo. “Offshore” is used to refer to offshore which is approximately a few kilometres away from the nearshore reefs. These reefs are within the customary jurisdiction of the villages. The marine resources of the nearshore and offshore reefs are referred to generally here as “coastal marine resources”.



(Source: MFMR Annual Report 2004)

Figure 8: Solomon Islands marine resources management areas

Nearshore marine resources are mainly found on the numerous coral reefs stretching out on most of the Islands. Coral reefs are widespread throughout the country. Barrier reefs are less developed, although there are barrier complexes around New Georgia, northeast Choiseul and in Utupua and Reef Islands of Temotu Province. Twenty kilometres of barrier reef extend westward from the Reef Islands group. Other shallow platform reefs are found north of the Reef Islands (UNEP, n.d).

Marine resources found on the coral reefs include vertebrates and invertebrate fisheries. These resources are targeted by subsistence and small-scale fishing activities. A large scale coastal marine resources assessment in 2004 found that the Solomon Islands has one of the highest diversity of coral reefs and one of the richest concentrations of coral fish in the world (UNEP, n.d). Within the South Pacific region, the Solomon Islands has the second largest and richest coral reef after Papua New Guinea. A huge number of species of sea cucumbers, 233 species of algae, six giant clam species, and five species of marine turtles are examples of this rich biodiversity. The Solomon Islands' coral reef is also an integral part of the Coral Triangle which has the highest marine biodiversity in the world (Green 2004).

3.2.2 Provincial level: Temotu Province

There is no overall scientific assessment of the fish stocks, their status, catch levels or sustainability of Temotu Province. Very little is currently known about biodiversity on the nearshore and offshore reefs of Temotu Province. The very little known is often inaccessible. However, a survey of fish communities in the Santa Cruz Islands group identified 725 marine species including non-reef species (UNEP, n.d). According to the PFO at Lata, there are twenty one known sea cucumber species of commercial value found in Temotu Province. These include amber fish, black teat fish, black spotted sea cucumber, brown sand fish, brown spotted sand fish, curry fish, deep water red fish, elephant trunk fish, golden sand fish, green fish, hairy black fish, leopard fish, lolly fish, pink fish, prickly red fish, selenkas sea cucumber, snake fish, stone fish, surf red fish and white teat fish. Many other sea cucumber species of no commercial value are believed to be present but the exact number is unknown.

3.3 Factors affecting coastal marine resources

Several studies and researchers (e.g. Aswani 1999, Foale and Manele 2003, Fairfax 2007, WWF n.d) have identified factors affecting coastal marine resources in the Solomon Islands. However, little is known and documented about Temotu Province. Coastal fishing activities are impacting on the levels and sustainability of the coastal marine resources in the Solomon Islands (Sebastine and Foale 2006). These fishing activities relate to subsistence and small-scale fishing. The extent and nature of impacts on Temotu Province are not fully understood. The reported factors are categorised into two broad categories: socio-economic and environmental factors. They are discussed in turn below.

3.3.1 Socio-economic factors

The socio-economic factors affecting coastal marine resources are increase in population, over-fishing, lack of awareness of the importance of marine resources, expansion and introduction of marine product markets, use of destructive fishing techniques and gear, coral extraction for betel nut chewing, land-based economic activities and tourism.

Increases in population

Rapid increase in the population base of the Solomon Islands is one of the main factors affecting coastal marine resources. The implications of increase population are complex and are related to other factors outlined below. The common argument is that as the population of the Solomon Islands increases the people's dependence on coastal marine resources for protein and income also increases (Aswani 1999, The Nature Conservancy 2004, WWF n.d, UNEP n.d, Fairfax 2007). Research by Fairfax (2007) confirmed this assertion. He pointed out that the increase in the population of Solomon Islands is also leading to overfishing.

Over-fishing

Over-fishing is another factor impacting on coastal marine resources as evident in some parts of the Solomon Islands. For example, in the Lau Lagoon of North Malaita, some preferred edible marine species have been lost (WWF n.d). Over-fishing over time removes matured stocks of marine species from the coastal reef. The reduction in the potentially reproductive marine species affects their ability to reproduce and contribute to the marine biodiversity. Eventually this cycle, over time, result in smaller populations of predominantly young marine resources.

Lack of awareness of the importance of marine resources

A Foundation of the Peoples' of the South Pacific International (FSPI) Officer interviewed stated that a lack of understanding of ecological about marine resources at the village level threatens the sustainability of coastal marine resources. This assertion was based on the FSPI's work with some rural communities in the Solomon Islands. He argued that as the population and the need for money increases, villagers are interested in the economic value of coastal marine resources. The importance and the sustainability of the marine resources become secondary. He pointed out that if the villagers had known about the importance and the need to conserve the marine resources, they would be much more aware of how to use and manage them on sustainable basis. Currently many rural communities of the Solomon Islands lack this kind of knowledge.

Expansion and introduction of marine product markets

The introduction and expansion of marine product markets has reportedly had huge effects on targeted commercial marine species. The recent introduction of live fish trade in the Solomon Islands could be seen as a potential factor that could affect the level of coastal marine resources in the future. This kind of trade also includes live coral trade. Several factors have attracted many rural people to the marine product markets. These include the attractive monetary returns for them, increasing need for money in a growing cash economy, and the realities of what the government can offer for them. The marine product markets are expanding in terms of the areas they operate. The opportunity to supply expanded marine product market is also causing many rural people to venture into small-scale fishing activities. They are over exploiting their coastal marine resources in return for cash (Foale and Manele 2003, Sebastine and Foale 2006).

Use of destructive fishing techniques and gear

The destructive fishing techniques employed by fisher folks are having devastating impacts on the coastal marine environment and the marine resources it contains. These techniques include the use of explosives such as dynamite and the use of poisons to catch fish (WWF n.d, Foale and Manele 2003, UNEP n.d, Fairfax 2007). Poison fishing includes the use of chlorine and poison plant species that provide poison. Blast fishing destroys the entire ecosystem to harvest already severely depleted fish stocks (Foale and Manele, 2003). Use of explosives and poison is unselective because they can

kill numerous non-targeted species. They are also reportedly causing damage to coral reefs (UNEP n.d).

According to Foale and Manele (2003), improved fishing techniques and gear also pose threats to coastal fisheries because they are inevitably resulting in much heavier fishing efforts. These include use of outboard motors, handheld global positioning units and scuba.

Coral extraction for betel nut chewing

One identified unusual but highly significant threat to coral reefs in the Solomon Islands is from the extraction of corals to produce lime for betel nut chewing. The lime is chewed together with betel nut fruits and pepper leaves. This is part of the locals' culture and it is as social habit. Chewing is becoming more common and addictive amongst most people despite health related issues (such as cancer). One estimate suggested that about 6 million kilos of lime are used per year, derived from 10 million kilos of live coral, making this market one of the largest single threats to reefs in the country (UNEP n.d).

Land-based economic activities

Land-based economic activities such as logging and tourism are also affecting the sustainability of coastal marine resources. Logging operations occur in only some provinces of the Solomon Islands, including Temotu Province. Sediment and oil run-offs from logging companies have been the main factors occurring in some rural villages in the Solomon Islands. These are some of the factors that people have pointed out whose impacts are often beyond the villager's control. Sewage disposal into the sea is also another land-based activity that is impacting the coastal marine environment.

Tourism

Tourism activities also impact on the level of marine resources. For example, snorkelling causes damaged to corals which are coastal marine resource habitats (UNEP n.d). Sebastine and Foale (2006) pointed out that although the access to equipment, logistics and technical knowledge about advanced fishing gear significantly remained outside the reach of most rural people, tourism is gradually changing the scenario.

3.3.2 Environmental factors

Global warming is also affecting the marine environment. Coral bleaching was reported from many localities from the western parts of the Solomon Islands and Ontong Java Atoll in 2000. However, information on the coral mortality rate was not collected (UNEP n.d). Coral bleaching results from high sea temperatures which kill reef corals. The most vulnerable marine species living in the area are also affected. Natural disasters such as cyclones and tsunami have also affected some coastal environments in the Solomon Islands. For example, the recent 2007 tsunami in the Western Province

has done significant damages to the affected marine environments (WWF Officer, interview May 2007).

3.4 Subsistence and small-scale (artisanal) fisheries

Fisheries in the Solomon Islands are categorised into three types: subsistence, small-scale and large-scale commercial fishing. Subsistence and small-scale fisheries are discussed under this section. Specifically, their basic characteristics, contributions to the national economy and livelihoods importance at the village and household level are discussed. The large-scale commercial fishery is deliberately omitted because rural populations do not engage in it. In any case, it is carried out offshore at a large scale, beyond the capacity of rural populations to actively participate.

3.4.1 Subsistence fisheries

Subsistence fishing involves the use of relatively traditional or simple fishing techniques and gear using manual labour. Subsistence fishing was originally carried out for consumption purposes only and sharing directly between families and kin of the fisher rather than sold for cash. Nowadays, surplus from subsistence fishing is often sold for cash. Macinko and Schumann (2007) have pointed out that “pure subsistence fishing” as practised in the past no longer exists. Rather what prevails is “semi-subsistence fishing” where the original characteristics have been changed such that surplus fish is sold for cash after family consumption needs have been met.

The subsistence fishing in the Solomon Islands exploits a wide range of vertebrate and invertebrate fisheries on the nearshore waters, including inter-tidal mangrove and inland waters. The Solomon Islands domestic coastal fisheries production for subsistence purposes is one of the highest in the South Pacific region (MFMR 2004).

Subsistence fishing is a dominant livelihood strategy for rural coastal communities of the Solomon Islands. The majority of the 80% rural-based population of the Solomon Islands engage in this fishery. It is part of their culture (FAO 2002). The Solomon Islanders eat approximately 47.9 kilograms of fish each year, making them the amongst the highest fish consumers in the world (Aqorau 2001). The subsistence fisheries are not only an important food source, but also a source of income for the rural communities to meet their basic needs (MFMR Report 2004; FAO 2002).

Subsistence fishing activities are beginning to have adverse impacts on the marine species targeted by the fishery. Prior to the 1980s, subsistence fishing was not a concern for most Pacific nations, including the Solomon Islands. This was due to the belief that marine resources targeted in this fishery were under-fished and the manner in which fishing was carried out was generally sound. However, over the recent decade concerns over coastal fisheries were highlighted in many countries in the South

Pacific, including the Solomon Islands. These concerns relate to over fishing and use of destructive fishing techniques and gear (Sebastine and Foale 2006, Foale and Manele 2003).

However, Foale and Manele (2003) claim that throughout Papua New Guinea and the Solomon Islands, subsistence fisheries are not yet under anything approaching the kind of pressure they are under in many parts of South-East Asia. Arguably, this does not exempt the Solomon Islands from any future impacts, given the population have increased and there is high consumption of edible marine resources.

3.4.2 *Small-scale or artisanal fisheries*

Small-scale fisheries are sometimes known as artisanal or coastal fisheries. The definition of small-scale fisheries varies between countries depending on the context in which it is carried out. However, in general small-scale fisheries are limited to nearshore waters and inland waters bodies (Sebastine and Foale 2006, Foale and Manele 2003). It often involves the use of labour intensive fishing technologies and are typically family-based operations that use small boats under twelve metres long (Sebastine and Foale 2006, Foale and Manele 2003). Small-scale fisheries are commercially oriented. For example, fish caught are mainly for sale and commercial non-fish species are collected. While this fishery focuses mainly on sale, some of the catch is for family consumption.

Some of the major coastal fish species fished in the Solomon Islands for commercial and subsistence purposes include emperors (Lethrinids), snappers (Lutjanids), grouper and cods (Serranids), Scombrids (mackerels) and Carangids (trevallies). In other places, surgeonfish, mullets and rabbit fish are also harvested by small-scale fisheries. About 180 species of reef finfish fish from 30 families are caught by the small-scale rural fisheries in the Solomon Islands. The common non-fisheries include trochus, bech-de-mer, lobsters, crayfish, giant clams, pearls, turbo and life corals (MFMR Report 2004). Sea urchins, crabs, octopus and oysters are also occasionally harvested in this fishery but it is not common in the Solomon Islands.

In the South Pacific countries coastal fisheries are estimated to contribute at least 50 % of the total fisheries production. The economic importance of artisanal fishing to developing tropical countries' economies is increasingly being highlighted (Allison and Ellis 2001; Sadovy 2005).

Small-scale fisheries play an important role in rural livelihoods and economies in the Solomon Islands in terms of protein and income. Many rural fishers earn income from small-scale fishing activities. It also contributes greatly to rural employment (both part and full-time) (FAO 2002). The seasonal nature of fishing means part-time fishers often engage in other non-fishing activities during these periods. In contrast, full-time fishers may fish throughout the year, but often modify their fishing

methods and gear to follow sequences of different periods of marine species abundance (UNEP n.d). Small-scale fishing is widespread and increasing in the Solomon Islands.

The marine species targeted by small-scale fisheries are under pressure from various factors discussed above. For example, an assessment by The Nature Conservancy (2004) claimed that there has been low numbers of commercially exploited species in most areas of the Solomon Islands, indicating that over-fishing is widespread. The assessment also asserts that the fish and marine ornamentals trade is also proceeding without regulation and it is likely that harvesting rates are currently unsustainable. With increasing population, urban drift and fish markets, there is increasing pressure on reef fish stocks in the vicinity of regional centres (WWF n.d). Fairfax (2007) claims that some parts of the Solomon Islands are experiencing depletion in fish stocks and that there is already initial evidence that indicates the collapse of fish stocks around the country. Sebastine and Foale (2006) also point out that over recent decades some marine species have collapsed due to use of modern techniques and expansion of export markets.

While the impacts of these affect the sustainability of rural marine coastal resources in the country, the rural coastal livelihoods of the citizens are also impacted. The magnitude of the pressure upon each marine species may vary between species and can be contextual. For example, the extent of the pressure on bech-de-mer is not the same as the pressure imposed on crayfish. In addition, the pressure on bech-de-mer can be more adverse in one location than another.

According to Hawkins and Roberts (2004), small-scale fishing, especially in the South Pacific, has insignificant impacts on marine resources because it is pursued by small-scale fishers who often use environmentally sound fishing techniques. In contrast, Sebastine and Foale (2006) argued that small-scale fishing is transitioning into enterprises that pose significant commercial and ecological threats. This is due to the fact that small-scale fishers are increasingly incorporating the use of advanced fishing technologies.

3.4.3 Other coastal resources

Other coastal marine resources which have had no ample consideration in the literature include sand, gravel, stones and dead corals on the sea shore. In the Solomon Islands these are basically owned by the clans or sub-clans that own the land adjacent to the seashore.

3.5 Linkages between different actors in marine resource management

There are two main actors in managing coastal marine resources in the Solomon Islands. They are the Government and the traditional authorities at the village level. NGOs and other international organisations also play an active role in marine resource management, especially at the village level.

The National Government together with the Provincial Government make up the “Government”. This section highlights the linkages between the traditional and central (Government) management.

3.5.1 The actors in marine resource management: Linkages

The Ministry of Fisheries and Marine Resources

The highest institution that is usually responsible for the management of the commercial small-scale fishery is the Ministry of Fisheries and Marine Resources. The organisation structure of the Ministry of Fisheries and Marine Resources and its linkages to the provincial and village level institutions is given below in Figure 9.

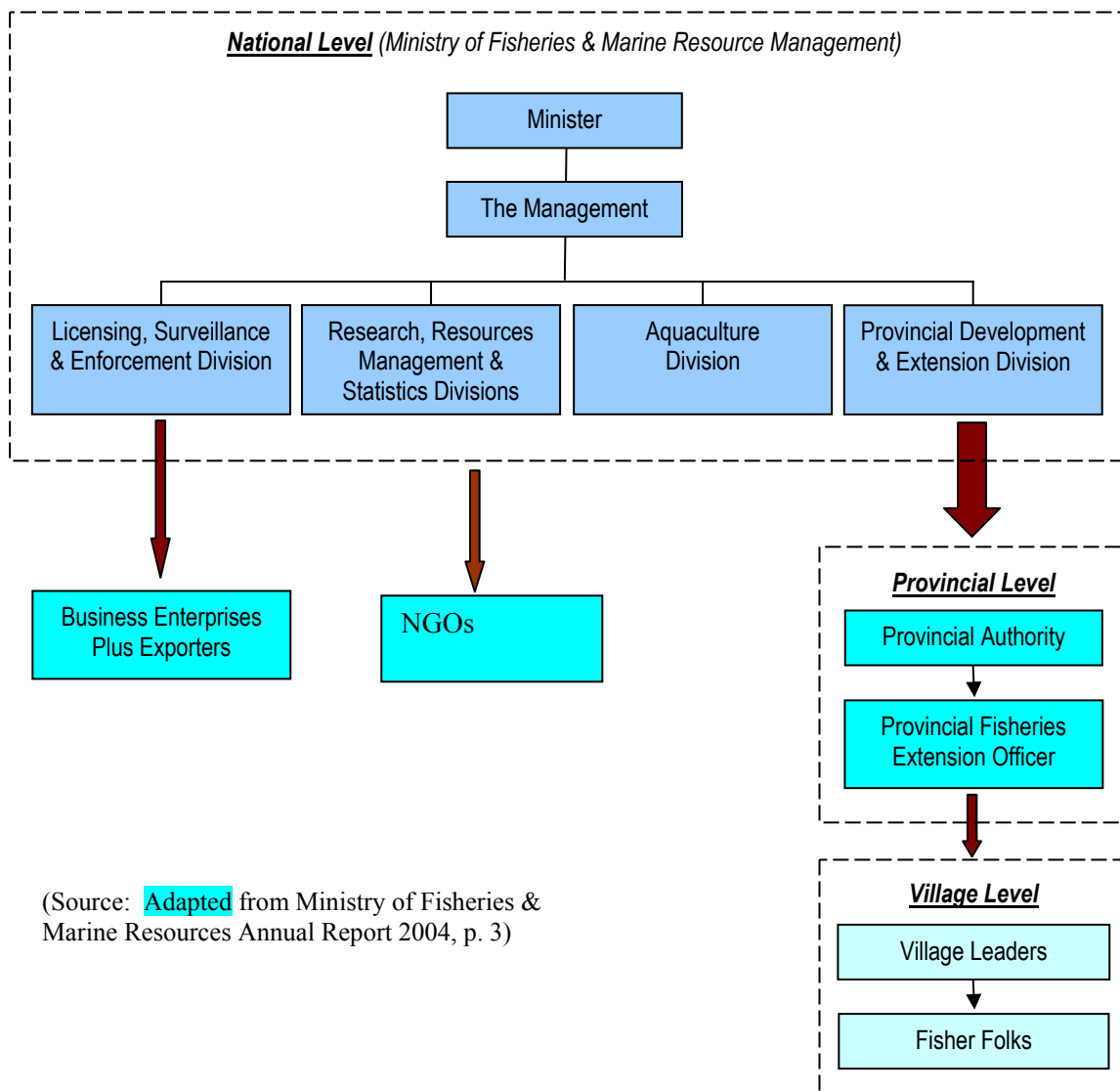


Figure 9: Linkages between the actors

The most relevant divisions for pertaining to marine resource management are the Provincial Development and Extension Division, the licensing Division, and the Research Division because they are related to the phenomena under study. It should be noted that rural aquaculture is also practiced in

the rural areas of the Solomon Islands, but not in Temotu Province. Provincial Development and Extension Division is the Division that links the Ministry of Fisheries and Marine Resources to the rural sector. It deals directly with fisheries developments, including management in the rural areas. Currently the Fisheries Extension Offices established in the Provincial Centres are under the Rural Fisheries Development Section. The Licensing Division issues licenses to exporters of Marine Products such as trochus, bech-de-mer, live fish, corals, crayfish, clams and shark fins. The exact number of the licensed exporters of marine products, apart from the Tuna Industry is unavailable. The Research Division is important because it plays an important role in conducting research, assessment and monitoring of marine resources for both nearshore and offshore fisheries.

The Provincial Government

The Provincial authority responsible for fisheries and marine resources usually works together with the Provincial Fisheries Extension Centre. In the Case of Temotu Province, the Extension Fisheries Officer closely works with the Provincial authorities on matters regarding the Provincial fisheries and marine resource developments and management. As stipulated in the Fisheries Act 1998, the Provincial Government under its Provincial Fisheries Ordinance can make laws to govern the exploitation of the marine resources within the Temotu Province waters. According to a National Fisheries Officer (NFO1) at Honiara, the Fisheries Ordinance is very important because it makes it easier for development interventions by the Provinces.

The village authority

There is no formal relationship between the village authority and the Provincial Government and the Ministry. However, the Extension Fisheries Centre is expected to reach the village communities in all matters channelled from the Ministry and the Provincial Government. For example, in Temotu Province, the Extension Officer pays visits to some villages for awareness purposes. Moreover, he disseminates information about marine resources bans by the Ministry and the Province to the villagers. He normally relays the information verbally by talking to a village leader or by sending them a letter. In most cases, the village leaders are requested by the Ministry of Fisheries and Marine Resource and the Provincial Government to enforce and monitor the ban. The village leaders are not legally required to carry out the request. Carrying out the request is essential but may be a second priority for the village leader. The request is not a legal responsibility of the village leaders because it is not a legal requirement by the Government.

NGOs and other organisations

A group of large non-governmental organisations (NGOs) and other institutions also play an important role in the management of marine resources in the rural Solomon Islands. They are WWF, The Nature Conservancy, FSPI and Solomon Islands Development Trust (SIDT). They work together with the Ministry of Fisheries and Marine Resources. In particular they often team up with the Ministry's

Research Section in undertaking research and assisting rural communities in managing their marine resources. These organisations operate in certain Provinces. They help villagers establish marine protected areas.

No NGOs are operating in Temotu Province. According to National Fisheries Officer (NFO1), some Provinces do not have these NGOs because they lack Provincial Fisheries Ordinance. The FSPI personnel mentioned that they do not operate in Temotu Province because they were not approached by the people and relevant authorities there.

3.5.2 *The actors' sphere of management influence*

The three actors (National government, provincial government and the village leaders) can impose management measures but the measures imposed can be effected only within the actors' sphere of influence. For example, the management measures imposed by the Ministry of Fisheries and Marine Resources are implemented nation-wide. The Provincial Government also imposes management measures which are implemented within the Province only. At the village level, the management measures imposed apply only to that village. Some of the management measures imposed may be at all levels. A classic example is a ban on the exploitation of certain marine species.

3.6 Policy perspectives on small-scale and subsistence fisheries management in the Solomon Islands

This section presents the policy perspectives on small-scale and subsistence fisheries marine resource management in the Solomon Islands.

Small-scale fisheries

The management of small-scale commercial fisheries is less structured than the large-scale fishing such as tuna management in the Solomon Islands. The marine species targeted in small-scale fishing activities are managed by the national and provincial authorities using mechanisms stipulated in the Fisheries Act 1998 (MFMR 2004). There are no specific articulated management goals for small-scale fisheries, but it is assumed that the objectives are consistent with those given in the Fisheries Act 1998. The objectives are to manage, develop and conserve the targeted commercial marine species through proper conservation and management measures to ensure their sustainability (FAO 2002).

To achieve the objectives the Fisheries Policy 1998 stipulates a number of strategies that should be applied. First, there should be cooperation between the Ministry of Fisheries and Marine Resources and the provincial authorities in managing any developments concerning commercial marine species. This includes the Ministry assisting the provincial authorities to prepare management and development plans for marine resources in provincial waters. Second, the national fisheries management and development plan should be adhered to for fisheries outside the provincial jurisdiction (see Figure 18).

The Fisheries Management and Development Fund should be utilised to promote effective management of the small-scale fisheries is the third strategy. The enforcement of export restrictions on exportable marine products is the fourth strategy. Lastly, any foreign business engaging in small-scale commercial fisheries should be licensed. These strategies apply mainly to the live fish trade.

The Fisheries Act 1998 gives the measures that may be taken to manage the commercial marine species. These include open or closed seasons; the closure of areas in which fishing may be prohibited, prescribing minimum mesh net sizes to be used, minimum marine species size limits, prescribing the number of fishing vessels (for offshore waters), prohibiting specified methods which are destructive or the use of specified types of fishing gear in provincial waters, and the establishment and protection of marine reserves. In practice, all of the above measures are presently used in the management of the small-scale commercial fisheries of the Solomon Islands. The effectiveness of the various measures is strongly related to the ease of enforcement of the specific measure. In terms of the effectiveness of these management measures, a recent World Bank survey (cited in FAO 2002) of coastal resource management in the Solomon Islands pointed out that the effectiveness is good for those national laws which can be enforced and are enforced through buyers and/or exporters. Management measures associated with marine turtles appear to have the least effectiveness.

In terms of small-scale fisheries management, certain management principles by the national government were set out in the Fisheries Act 1998. These are applicable throughout the Solomon Islands. Each Provincial Assembly may make ordinances consistent with the Act or any regulations made under the Act for the regulation of fisheries within its provincial waters. However, there is joint national/provincial enforcement of legislation. Some fishery resources, such as turtles and crocodiles are managed by the Environment and Conservation Department (FAO 2002).

The stakeholder input into the management arrangement of small-scale fisheries at the national and provincial level varies. At the national level the stakeholder input is through the Fisheries Advisory Council and the elected representatives to Parliament. There are various forms of stakeholder input at the provincial level, depending on the workings of the provincial fishery services and as stipulated in provincial legislation (FAO 2002).

Information for management decisions is obtained from specialised research projects focused on specific fisheries, visits by Fisheries Officers to specific fisheries, the Customs Department export database, the licensing database of the Fisheries Division, voluntary submissions by processors/exporters, and Parliamentary proceedings and subsequent research on small-scale fisheries (FAO 2002).

Subsistence fisheries

There is no specific Government articulated set of objectives for the management of subsistence fisheries. However, it is generally assumed that safeguarding the subsistence fisheries to contribute to ensure food security for the rural communities is the main objective. Therefore the Fisheries Act 1998 does not stipulate the management measures for subsistence fisheries. Rather, it recognises customary marine rights. Specifically, it recognises that marine resources found within customary jurisdiction should be managed by the customary marine rights holders. The specific management measures vary throughout the Solomon Islands. Many of the systems involve village or tribal leaders restricting access by outsiders, as well as various kinds of harvest taboos for residents. The Fisheries Act 1998 does not give these village and tribal leaders the authority to restrict outsiders but rather it was part of the people's traditional marine resource management system. Reduction in fishing effort to prevent over-exploitation of resources is often, but not always, the intent of these measures. It is generally thought that customary management works reasonably well in the Solomon Islands context (Johannes 2002).

Enforcement of customary marine resource management is generally carried out by the villagers of the local area concerned. While the enforcement is traditionally in the hands of the leaders of the rights holders, the government can be involved under the Fisheries Act 1989. The Fisheries Act (cited in FAO 2002, p. 7) states: "When it is proved that customary fishing rights have been breached the court may order compensation to be paid to the customary fishing rights holders".

3.6.1 Institutional marine resource management issues

The management issues at the government or official level pertain to the Provincial and the Ministry of Fisheries and Marine Resources. The village level management issues are largely omitted in this section because it is addressed in detail in Chapters Six and Seven.

The key institutional management issues that have arisen over the years are presented in this section. The Ministry of Fisheries and Marine Resources lacks resources to fully effectively achieve its management objectives. According to a National Fisheries Officer (NFO1) at Honiara, the government does not have the capacity or resources (funds, human resource and technological capacity) to enforce regulations. The government therefore leaves the enforcement responsibilities to the village leaders. This has limited enforcement of regulations such as size limits, bag limits, gear restrictions, and seasonal closures on certain commercial coastal fisheries, such as the bech-de-mer fishery. For example, according to the Provincial Fisheries Officer (PFO) at Lata, the Office may have performed better if there had been more staff and also if the extension office had been fully equipped with necessary facilities that could meet the Province and the village fishers' needs.

The management of small-scale fisheries by the Government is often characterised by a top-down approach. According to Ramofia (n.d), the government's "top-down" approach to management is not working. He specifically refers to the management of bech-de mer. He attributes this to some notion that the resource owners and users lack ownership over the management measures. For example, the people often have no input at all in the decision making about the small-scale fisheries management measures, and therefore do not have the motivation or commitment to actively support them.

According to the three National Fisheries Officers interviewed at Honiara, the Fisheries Legislation used is out of date. It does not adequately cater for the current Fisheries and Marine resources circumstances. Amending the Legislation is currently one of the Ministry's main objectives.

Licensed marine product operators claim that there are competing unlicensed operators illegally exporting marine products (interviews with three National Fisheries Officers April 2008). Some villagers are attracted to these operators because they often offer higher market prices for commercial species. Tracking these operators is, however, difficult.

The Provincial Fisheries Ordinance is important to facilitate better provincial fisheries development and management, but until now only a few Provinces have formulated Ordinances. An example is the Rennell and Bellona Province. A National Fisheries Officer at Honiara pointed out that it will be very good for all the Provinces to formulate their own Fisheries Ordinance. However, the Ministry does not have enough human resources to assist them with legal issues, but they can be referred to responsible independent legal advisory entities (National Fisheries Officer (NFO1)).

Statistics on coastal fisheries that should aid and inform management authorities are not readily available, and those available are often unreliable (FAO 2002). The implication of this is that, the extent to which the Ministry assesses, monitors and evaluates the status of the coastal commercial marine resources is limited. This increases the potential for commercial coastal fisheries overexploitation.

An Institutional Strengthening Project funded by NZAID is currently being implemented at the national level to address these institutional issues.

3.7 Future marine resource management prospects

The future marine resource management prospects seem to be "community (partnership)-based fisheries management". This is one of the major components of the NZAID funded project mentioned above. This approach is due to the belief that management by the Government is no longer working, specifically on the management of the commercial species targeted by the small-scale commercial

fishing activities. A few Provinces in the Solomon Islands have been used as pilot cases. For example, Ngella in the Central Province.

According to a National Fisheries Officer (NFO1) at Honiara, unless there is a sufficient level of commitment to community-based fisheries management, the outcomes may not be fully achieved.

3.8 Chapter summary

The Solomon Islands is endowed with rich coastal marine resources. While some studies have been undertaken in some parts of the country, very little is known about Temotu Province's nearshore and offshore marine resources. The coastal marine resources are important for the rural coastal livelihoods. Subsistence and small-scale fisheries are common and widespread. Both fisheries target a wide range of marine species and have potentially negative effects. Various socio-economic, environmental and institutional factors have caused concerns over the state of coastal marine resources in the Solomon Islands.

The Fisheries Act 1998 of the Solomon Islands outlines how subsistence and small-scale fisheries should be managed, particularly the management of the marine species targeted by fishing activities. Subsistence fisheries are to be managed by the customary rights holders and the Provincial and the National Government are empowered to manage the small-scale fisheries. Under the Fisheries Act 1998, there are two main actors in the management of coastal marine resources, the Government and the village authority. The Government actors include the national and the provincial government and the village authority refers to the village leaders and the customary marine resource management regime. Each of these actors can impose marine resource management measures. The measures are effective only within the actor's respective spheres of influence.

Since the Government lacks sufficient resources to monitor and enforce management measures the rural communities are the key stakeholders. For this reason, an understanding of the interactions between the coastal rural communities' livelihood and marine resource management is necessary.

The previous two chapters presented the background to the study without ample treatment of studies relating to coastal rural livelihoods and traditional marine resource management under customary marine tenure. The next chapter, Chapter 4, fills this void by reviewing theory and research on coastal rural livelihoods and traditional marine resource management under customary marine tenure.

Chapter 4: Theoretical Context

4.1 Introduction

Relevant concepts and studies relating to marine resource management under customary marine tenure and livelihoods are reviewed in this chapter. Specifically, Section 4.2 reviews traditional marine resource management under customary marine tenure. Various traditional marine resource management practices under the customary marine tenure are discussed in Section 4.3. The significance of traditional beliefs and knowledge are presented in Section 4.4 and the factors reported elsewhere as influencing marine tenure in the Solomon Islands are discussed in Section 4.5.

Apart from traditional (community-based) marine resource management, the other two types of marine resource management, namely, centrally-based and partnership-based (co-management) regimes are also discussed in Section 4.6. These regimes are discussed in the context of South Pacific Island countries. Livelihoods dynamics is discussed in Section 4.7. This is followed by a discussion of gender and fisheries in Section 4.8. A summary of the chapter is in the last section, Section 4.9.

4.2 Customary marine tenure

Customary marine tenure and management of coastal marine resources has been the subject of lively academic research within the Pacific region and elsewhere in the World. In the South Pacific region numerous studies on customary marine tenure and marine resource management have been conducted by a number of researchers (e.g. Hviding 1989, 1996, Carrier 1987, Ruddle 1996, 1998, Hickey 1998, 2006, Asafu-Adaye 2000, Townsley et al. 2001, Lam 1998, Johannes 2002, Cinner 2006). Studies undertaken specifically in the Solomon Islands are Aswani (1999, 2002), Crean (1999), Hviding (1996), Sebastine and Foale (2006) and Foale and Manele (2003). These studies covered different aspects of the customary marine tenure systems and have highlighted in particular the importance of boundaries and rights of customary sea areas and resources, the role of traditional knowledge and belief in traditional management, factors that influence customary marine tenure, how customary marine tenure can aid partnership-based marine resource management regimes and the benefits of such management to the community.

4.2.1 Definitions

Customary marine tenure and sea tenure are synonymous and can therefore be used interchangeably. The term “sea tenure” is an umbrella term originally used to refer to the many and varied ways in which indigenous communities define their rights to marine resources in their traditional waters. According to Aswani (2002, p. 1), “sea tenure is a situation in which particular groups of people have riparian entitlement to nearshore areas and in which their entitlements to use and access resources are excludable, transferable, and enforceable, either conditionally or permanently”.

According to Asafu-Adaye (2000), the term “customary marine tenure” was coined by Hviding (1989) when he used it to refer to the forms of sea tenure practised in the Pacific Islands. The term “customary” is used to refer to the notion that these forms of sea tenure are founded on traditional roots and linked to the past. And he used the term “marine” to illustrate that the system deals with coral reefs, lagoons, coasts and open sea, including islands and inlets. He also used the term ‘tenure’ to refer to the notion that the system deals with access to marine areas, including their regulation and exploitation (Asafu-Adaye 2000).

The natural resources literature identifies five broad classes or forms of resource ownership and tenure rules. These are open-access, individual use rights, community-based or joint property, private property and state ownership. According to Asafu-Adaye (2000), technically customary tenure systems are quite distinct because they consist of unwritten rules that make use of local environmental knowledge embedded in the culture to manage access to fishing areas and stocks of marine resources.

A customary form of tenure over marine areas and resources is frequently encountered in the South Pacific region and it is often interpreted as a form of marine resources management (Townesley et al 2001, Ruddle 1994, Berkes and Farfar 1989, Bromley and Cernea 1989, Berkes 1994). However, Aswani (2002) has challenged this interpretation by arguing that customary marine tenure is not necessarily designed as a functional ecological “traditionally-based” system to conserve and/or manage marine resources.

4.2.2 Concepts of customary marine tenure

Customary marine boundaries under customary marine tenure

Estuaries of rivers, seashores, mangrove swamps, big rocks, big shore trees and reef passages were used as reference points or landmarks under some customary marine tenure systems to mark marine boundaries over which a custodian can claim ownership and access. From these reference points, the sea territory can stretch outwards to include the submerging reefs. In some countries such as the Solomon Islands the boundaries extend as far as one can see from the tallest coconut tree (Aswani 1999, Asafu-Adaye 2000).

The boundaries of customary marine tenure systems are complex and sometimes can pose difficulties (Ruddle 1996). For instance, in Papua New Guinea, Asafu-Adaye (2000) reported that customary boundaries sometimes clash with the Government boundaries due to the fact that the Government only recognises customary marine tenure within three miles of the Papua New Guinea coastline. Townesley et al. (2001) asserted that colonialism has had remarkable but disruptive impact on the notion of “property” relating to the mapping of customary areas and boundaries. For example, marine boundaries became fixed. This disrupted the interaction between various tribes and clans which exercised tenure. Furthermore, the colonial authorities inevitably seem to have believed one version of

“who owns what” rather than the opinions of many others. Consequently, as the boundaries acquire economic value, disputes over boundaries and ownership become common occurrences.

Coastal communities have connections with their marine environment which extends beyond three miles of the coastline or as far as one can see. Communities often have folklore which asserts that their ancestors were the original inhabitants and users of these particular areas. Indigenous coastal communities have a holistic connection to the sea and certain marine sites are of special religious and cultural significance. For these and other reasons, some customary marine tenure systems may not have well demarcated boundaries. For example, some species of social-cultural significance (e.g. turtle, sharks, and tuna) are migratory and regarded as an inseparable component of these seascapes. Therefore, the community’s connections to these animals and the marine environment may transcend government-imposed boundaries (Asafu-Adaye 2000).

A study by Townsley et al. (2001) showed that the notion of “tenure” makes it difficult to clearly define a particular customary marine area. Traditionally the sea as well as the land were regarded as an integral part of the people’s lives and could not be separated from their cultural identity. This identity was largely rooted in the custodian’s tradition of sharing the marine resources rather than controlling and protecting them from outsiders. Thus, the notion of “customary tenure” illustrated the significance of a particular marine (or land) area as being a medium of exchange. Consequently, the intrinsic value of an area’s resources and the exclusive rights to exploit resources appeared to be secondary until the recent advent of commercialised marine resources and perhaps sale of fishing rights in customary tenure areas.

Customary marine rights under customary marine tenure

Definition

Rights and rules are interchangeably used in the literature. “Rights” refer to particular actions that are authorised, and “rules” refer to the prescriptions that create authorisation (Pahlevi 2005). A “right” is the guarantee given by a collective authority system to those who are part of the entity (Swallow and Bromley 1995). Schlager and Ostrom (1992) define a hierarchy of rights which they divide into constitutional choice, collective choice rights and operational choice rights.

The *constitutional choice rights* at the macro level provide the framework for resource management and are often external to the local community. *Collective choice rights* include management, exclusion, and alienation rights. Management rights include the right to regulate internal use patterns and to transform the resource by making improvements. Individuals or institutions with management rights have the authority to determine changes to a resource, and how, when, and where harvesting from a resource or territory may occur (Pahlevi 2005). Generally, the same individuals or institutions also exercise some form of exclusion rights (i.e. the authority to define the qualifications that users

must meet in order to access or withdraw from a resource). Exclusion rights define the right to determine who will have access and withdrawal rights, and how those rights may be transformed. Alienation rights are the right to sell or lease either one or both of the above collective-choice rights (Schlager and Ostrom 1992). Alienation rights include the right to transfer part of or all of the collective-choice rights of management and/or exclusion to another individual or group. Having alienated those rights, the former rights-holder(s) can no longer exercise authority over the resource or the part thereof that has been alienated, for the duration of the alienation contract or agreement (Pahlevi 2005).

The most relevant *operational choice rights* are access and withdrawal rights. Access rights define the right to enter a defined physical space, while withdrawal rights specify the right to obtain the products of a resource (e.g. to catch a certain amount of fish using permissible fishing methods under existing laws and regulations). Access and withdrawal rights may be constrained by a number of conditions, for example, gear restrictions, seasonal harvest, or licensing requirements. Possession of the rights of access and withdrawal can be gained through giving, purchasing, leasing, licensing, or bequest. In some instances, mostly in traditional societies, including in the Solomon Islands, these rights are held without the support of formal documents but traditionally passed from generation to generation (Pahlevi 2005).

Schlager and Ostrom (1992) further classify rights-holders or user groups in a hierarchy. The classification is in terms of authorised users, claimants, proprietors and owners. Authorised users are individuals or groups who may exercise the basic operational rights of access and withdrawal, either permanently or temporarily, as in a lease, licence, or share-cropping arrangement. Claimants consist of individuals or groups who possess the same operational-level rights as authorised users and also exercise the collective choice right of management. Claimants may devise rules that define withdrawal rights, but do not exercise authority to decide who may gain access to the resources. Proprietors include individual groups who exercise the collective-choice rights of both management and exclusion. Owners are individuals or groups who, in addition to exercising collective-choice rights of management and exclusion, can also sell or lease these rights to other individuals or groups.

The case of customary marine rights

Understanding traditional marine resource-use rights is central to understanding marine resource management under customary marine tenure. In the Solomon Islands, marine rights are usually in the hands of the individuals, tribes, clans or villages that own the adjacent land. The rights may be subdivided and allocated to individual heads of families (Hickey and Johannes 2002). Hickey (1998, 2006) points out that under customary marine tenure, reefs were viewed as extensions to the land, and their management was generally, but not always, the responsibility of the adjacent land custodian.

These kinds of customary rights are often formally recognised by the Governments of some South Pacific countries such as Samoa, Fiji, Palau, Papua New Guinea, the Solomon Islands and Vanuatu (Johannes 2002). In the case of the Solomon Islands, Foale and Manele (2003) claimed that the laws relating to ownership of foreshore and seabed seemed ambiguous. Kabui (1997, p.141), cited in Foale and Manele (2003, p.5), concludes from a thorough analysis of legal rights of reefs and foreshores under customary marine tenure that:

“The introduction of the common law of England in 1893 does not take away customary rights of ownership of the foreshores and reefs, depending on the facts of each case and proof of the existence of customary rights of ownership” (Kabui 1997, p.141).

The case of customary marine tenure

Aswani (2005) identified a number of features that characterise customary marine tenure in the Solomon Islands and elsewhere in the Pacific. These attributes include excludability, subtractability, transferability, durability, existence of property rights and security of title.

Excludability refers to those excluded and included in using the resource. According to the hierarchy of rights-holders or user groups (Schlager and Ostrom 1992), exclusion rights is exercised by the primary right holder. This includes the village leaders or tribal leaders and the primary right holders of the adjacent land. The direct transfer of primary rights by traditional authorities or tribal leaders (usufruct rights) can also give a person or group primary right to exercise exclusion rights as well. Secondary rights are determined by marriage and residence and the holders of such rights may be regarded as traditionally authorised users. The primary, secondary and usufruct rights pertaining to customary marine tenure are observed in the Solomon Islands and elsewhere in the South Pacific. Those who are entitled to these forms of rights are permitted to access and use the resources and those who are not entitled to these rights are excluded (Schlager and Ostrom 1992).

Under customary marine tenure, entitlements to marine area do not only apply to geographical locations but also to specific habitats, technologies, and species or a combination of these (Aswani 1999, Crean 1999). The extent to which entitlement holders exercise their exclusive rights to keep out outsiders varies from location to location. It is influenced by, among others, settlement patterns, the effectiveness of traditional governance, population pressure, commercialisation of fisheries, and the level of legal recognition the government give to customary marine tenure. Moreover, the historical processes of a community also determine whether entitlement to a marine area and resources are nucleated or dispersed geographically today in the Solomon Islands (Aswani 1999).

Subtractability refers to a case where one's exploitation of a marine resource reduces the amount available for the users (right holders) in the long run (Feeny, et. al., 1990, Oakerson, 1992, Aswani 2002). Aswani (2002) points out that in the Solomon Islands coastal rural communities with effective

territorial strategies have higher fishing yields than those who do not. *Transferability* refers to the ability or degree to which a transfer of user rights to offspring, kin or affinal members takes place. These rights may be primary, secondary, or usufruct in nature. Transferring rights is often contextual and may differ from location to location. *Durability* refers to the length of time for which the use right is held. This can be temporary or permanent, depending on an individual's status and kinship ties to the original claimants of a marine territory. *Property rights* in customary marine resource management institutions represent an array of different tenure claims which are rooted in the local people's traditional law or control. And *security of title* is the recognition of rights to sea area either formally or informally (Aswani 2002).

4.2.3 Models of customary marine tenure

From a study conducted in the Western Province of the Solomon Islands, Aswani (1999) outlined three models of sea tenure. They are the territorial-enclosed entitlement sea tenure model, the mosaic-entitlement model of sea tenure, and the transitory-estates model of sea tenure. These are briefly described below.

The territorial-enclosed entitlement model of sea tenure presents a situation in which territorial boundaries are circumscribed. Jurisdictional power over territorial matters is centralized, and sea tenure entitlements are regionally recognized. This model consists of various tribal groups dispersed in several villages under the administrative umbrella of one authority. Members within the inclusive group (polity) jointly use and manage common-property marine resources. Territorial perimeters are well defined, and participants in the commons conceptualize their tenure rights as inalienable. Entitlements enclosure results from marriage and subsequent pooling of entitlement rights (Aswani 1999).

The mosaic-entitlement model of sea tenure refers to a situation in which territorial boundaries are disputed, authority over marine areas is decentralized and contested, and entitlements are regionally scattered across several groups. Participants in this sea tenure model conceptualize their entitlements as incorporating other regional claimants' subsistence usufructory rights, but assert exclusive custodianship over their sea space (Aswani 1999).

The transitory-estates model exhibits organizational elements of the territorial-enclosed and the mosaic-entitlement models of sea tenure (Aswani 1999).

4.3 Traditional marine resource management practices under CMT

The main traditional marine resource management practice in the Melanesian countries of the South Pacific is fishing closures (commonly referred to as taboos in the Solomon Islands). Hickey (2006) highlights other traditional marine resource management practices. They include privileged-user

rights, species-specific prohibitions, seasonal closures, food avoidance, protected areas and behavioural prohibitions.

4.3.1 Fishing closures or taboos

Taboos or fishing closure involves preventing fishing in a particular coastline for a definite period, usually less than a year (Ruddle 1998, Aswani 1999, Johannes 2002, Foale and Manele 2003, Hickey 2006). According to Foale and Manele (2003), a taboo is often enforced after the death of a leader from the clan or family that owns the adjacent land. A stick is often erected to serve as a public notice to resources-users and is often announced by an influential leader of the tribe or clan. Moreover, the taboo is sometimes imposed along with conditions or curses associated with sorcery so that whoever violates that taboo might get sick or fall into misfortune which often resulting in severe injury or death (Foale and Manele 2003, Hickey 2006).

Foale and Manele (2003) argue that the potential of taboos as a management tool is limited by the fact that taboos often last for short periods, usually less than a year. This length of period, over time, is not sufficient for recovery of marine species which take many years to recover from over-fishing and other detrimental impacts. When fishing pressure is high, stocks of most fished marine species (those that take a longer period to recover) can be seriously depleted despite periodic closures. Moreover, traditionally-based temporary closures cannot facilitate recoveries of marine species with larger dispersal distances although they may be successful for marine species with shorter dispersal distances (Tewake et al., 2001, Aswani and Weiant 2003). According to Foale and Day (1997), this has already happened in the Solomon Islands and elsewhere in the South Pacific. Hickey (2006) asserted that taboos have undergone changes due to the introduction of commercial species. These changes relate to who imposes taboos, when the taboos are imposed, reasons for the taboos, what kinds of restrictions were involved in the taboo and the level of compliance by the marine resource users.

The consequences of violating taboos vary amongst cultural groupings. In some areas, the penalty is associated with supernatural forces such as a curse upon the transgressor. Such curse can only be revoked if the offender confesses his wrong. Continual disobedience of the taboos sometimes results in death or setting the transgressor adrift. In most cases, the traditional leaders impose fines in the form of traditional money and other valuable items such as pigs and mats (Hickey 2006, Foale and Manele 2003).

4.4 Traditional beliefs, knowledge and marine resource management

Traditional knowledge is a cumulative body of knowledge, innovations, practices and beliefs of indigenous and local communities around the world, about the relationship of living beings (including humans) with each other and with their environment (Iglis 1993). Developed from experience gained over the centuries and adapted to the local culture and environment, traditional knowledge is

transmitted orally from generation to generation by cultural transmission. It tends to be collectively owned and takes the form of stories, songs, folklore, proverbs, cultural values, beliefs, rituals, community laws, local language, agricultural practices and fishing practices.

Traditional knowledge and beliefs are important to the customary marine resource management system. The traditional knowledge possessed by individuals ensures the continuity of what was practiced in the past to continue to the present. Traditional beliefs are part of the wealth of traditional knowledge acquired and possessed by the people, and it shapes the way they carry out their traditional livelihood activities, such as marine resource management and fishing.

According to Davis and Ebbe (1993), traditional knowledge is a fundamental basis to any local cultural values, religious beliefs, and collative identities. Therefore, to isolate it from its cultural context is to lose sight of the meaning that it has for the survival and integrity of indigenous peoples. Most indigenous communities want respect for their cultural values of their knowledge and their rights to maintain these values must be acknowledged in the development process. There is congruency between the preservation of traditional knowledge and development. Traditional knowledge can be seen as a “tool” or “instrument” to promote culturally sensitive or appropriate forms of development. This is particularly clear in the areas of environment and natural resource management in which the use of traditional knowledge is seen as a key factor for enabling sustainable development (Davis and Ebbe 1993, Lam 1998)

Protocols were embedded and preserved in oral traditions. They were often derived from whom and where they claim as their creator or origin, and were sanctioned by their ancestors as “the way”, which were orally transmitted to subsequent generations as a holistic approach to life in the village. Consequently, the people were ritually part of that sanctified world and were symbolically one with their gods and ancestral spirits (Hickey, n.d).

Many fisheries bodies want to incorporate traditional knowledge into contemporary marine resource management regimes (Lam 1998). Customary marine tenure systems need a firm foundation of traditional knowledge of marine resources and their management. However, much traditional knowledge is lost as older keepers of the knowledge pass away, and the younger generation are engaged in a changing world of modern education and mobile youth.

According to Hickey (2006), customary marine resource management under customary marine tenure has no specific formulated management measures or rules to manage the village coastal marine resources. The manner in which management was arranged and carried out was indistinguishable from the people’s culture and indigenous beliefs, as well as the nature of their political and social structures

(McKinnon 1993). The use of marine resources is interwoven with aspects of local culture, and knowledge that can vary greatly from place to place.

It is therefore important to consider the people's traditional knowledge, beliefs, practices and protocols in the context in which the traditional management measures, as well as harvesting techniques were practised. The context is very much within the framework of the cosmological or belief system held in their ancient times. Prior to the arrival of Christianity, traditional beliefs were generally significantly rooted in the traditional belief that all things have a spirit and that all events and activities such as fishing inherently have connections to these spirits (Hickey, 1996). For example, most fishing practices stemming from traditional beliefs were highly ritualised and were undertaken by specialists who received their knowledge from their elders. Most involved the use of sacred leaves along with other rituals. Through this the power of the ancestral spirit is evoked for protection during fishing and to ensure good catches. This restricted entry to fishing activities, and had significant impacts on marine resource management.

4.5 Factors influencing customary marine tenure in the Solomon Islands

Customary marine tenure is significantly changing in the South Pacific region. The general consensus among researchers (e.g. Ruddle et. al.1992) is that customary marine tenure regimes are highly dynamic. They are institutionally and managerially eroded by the influence of exogenous forces and endogenous factors (Aswani 1999). These include indigenous socio-cultural change (Johannes 1981, Graham and Idechong 1998, Ruddle 1994, 1998, Aswani 1999), religion (Ostrom 1990), market influences (Hviding 1996), colonialism and neo-colonialism, demographic changes, urbanisation, economic development (Aswani 1999), dependence on resources (Agrawal 2001), technological innovation (Foale and Manele 2003), expansion of marine product markets and new markets opening up (Foale and Manele 2003). In addition, references have been made to conflicts (Polunin 1984, Adams et al 2003, Cinner 2005), cultural homogeneity (Ostrom 1990, Pretty 2003), and resource variability (Cinner 2005). The historical process of a community and its settlement patterns over years is another factor that may affect customary marine tenure (Aswani 2002, Aswani and Hamilton 2004).

In the case of the Solomon Islands, Aswani (1999) asserted that CMT is more long-standing than in other Pacific countries despite the changes brought about during the 19th and 20th centuries. The following discussions present the case of the Solomon Islands, in the light of the relevant and related studies highlighted above. In the process the discussion highlights the systematic exposure of the Solomon Islands to Western influences through its history, the forces that have brought about profound influences (both positive and negative) on the local people's culture and way of living, including customary marine tenure.

The advent of Christianity was one of the initial Western influences in the Solomon Islands. Specifically, it has been responsible for the loss of some of the traditional practices and beliefs that were regarded as part of customary marine resource management. For example, prohibited coastal locations not traditionally fished were later opened to fishing because of the Christian influence. Christianity also caused people to live together in terms of location thus affecting the traditional marine boundaries and rights to marine areas (Aswani 1999).

The Western cultural influences were administratively and politically consolidated by the Colonial government (1893-1978). For example, Townsley et al (2001) asserts that customary boundaries became fixed such that entire cultural and social relations that existed between groups that used to share the boundaries were disrupted.

In 1978, the Solomon Islands attained its political independence. The attainment of independence has brought about further changes not just to marine resource management, but also to all aspects of the people's lives. According to Crean (1999), when the Solomon Islands attained its independence, the need for economic development increasingly became more important. This has caused the Solomon Islands to turn to natural resource exploitation as a means for improving the economy. In terms of marine resources, in the 1970s and 1980s, the country initiated tuna fisheries development. Small-scale commercial fishery was also explored. The advent of the latter has offered a means for the local communities that were previously involved in a barter system (traditional economy) to assimilate into the cash economy (Crean 1999).

In the early 1980s, it was evident that planning, development and management objectives of coastal resources had undergone a shift with the expansion of commercial activities. The traditional marine strategies and the commercial fisheries had diverging objectives. For example, traditionally the objectives of marine strategies were largely socially oriented, aiming at food security, sustainability, reinforcement of cultural norms, equity and identity. There were other objectives such as technological, but these were secondary. However, the coastal commercial fisheries aimed at contributing to employment creation, generation of foreign exchange, increasing gross domestic product increase, and regional development (Crean 1999). These diverging objectives began to put pressure on the traditional and self-contained ways in which the people looked after their marine resources.

To optimise economic development, the Government of the Solomon Islands decided to replace the traditional political institutions that support customary laws with a new district and national government structure. The traditional social hierarchies which were already weakened were further diminished in power and importance as the new Government structure was introduced. As commercial activities became widespread and customary laws were marginalised by the modern legal system, the

practical and self-contained management structures of the traditional institutions were weakened as the central bureaucracy took up the responsibilities (Lam 1998, Crean 1999). According to Aswani (1999), the inherited Western legal system has encouraged land privatisation and treats the ocean as an open-access resource.

According to Crean (1999), the intention of the new district and national government structures was to transform subsistence fisheries into commercial fisheries. The civil service created fisheries extension services by having extension offices in all the provinces. Management and planning of commercial fisheries was taken from the traditional institutions to the central bodies under the new government structure. The management and planning duties were in the hands of the Extension Officer while inputs by the traditional users and managers were lessened. The wealth of traditional knowledge of the local people was ignored in the planning and management process. Modern science was utilised instead of traditional knowledge. Similarly, traditional management measures under customary marine tenure were replaced by measures introduced by the government.

Crean (1999) further asserts that as the exploitation of coastal marine resources for commercial purposes increased, the adoption of new and efficient technologies increased. These technologies have created an easier and efficient means of harvesting marine resources for the locals increasingly participating in the cash economy. Preference for using modern gear and even techniques have increased and become widespread. The cultural value of the traditional harvesting gear and techniques, which used to be part of customary marine resource management under the marine tenure regime, has diminished as a consequence of these developments.

Urbanisation is another important factor that has emerged from the process of modernisation and assimilation into the cash economy (Aswani 1999). Through the establishment and expansion of urban centres, land and coastal areas were acquired by the government. The customary entitlement and therefore the traditional marine tenure over these coastlines were taken away. In addition, migration of younger generations into the urban centres has further disrupted the usual transmission of traditional knowledge which underpins traditional marine resource management. According to Aswani (1999), the urbanisation process affects the durability of user rights held by claimants of a marine area. The user rights depend on the individual's status and kinship ties to the original claimants of a marine area.

Apart from the exogenous influences discussed above, Aswani's (1999) Roviana research found that customary marine tenure is also institutionally eroded by a complex set of inter and intra-community historical processes. For example, inter-marriages, inter-island trade, warfare and the spread of Christianity. These historical processes have resulted in different customary marine tenure configurations that can vary between geographical locations. For this reason, Aswani (1999) argued that consideration of inter and intra-regional variation of sea tenure regimes and the multiple

repercussions of such diversity is important. Unfortunately, it is given scant treatment in the literature. In particular, Aswani (1999) suggested that historical and spatial settlement patterns across the coast also impact on the property relations or rights, and have caused the differences in management strategies across customary marine tenure systems. Settlement patterns influence how the entitlements respond to changing demographic and socio-economic forces.

As noted previously, the country's population is increasing. The implication for customary marine tenure or common property institutions has been the subject of "lively academic debate" (Aswani 2002). The conventional view is that as population grows, and indigenous resource owners intensify their production, land holdings will eventually be transformed from communal to private forms of tenure (Boserup 1965). In addition, resource economists and demographers, argue that increases in population, migration and consumption accelerate the collapse of common-property institutions such as customary marine tenure and that this leads to resource degradation (Jodha 1985, Asafu-Adaye 2000).

These views were criticised by those who proposed that common property institutions can be vigorous enough to survive through population, economic and political changes, and can avoid issues relating to lose of collective action. They argued that common property users have entitlements (formal and informal rights) which enable them to translate regulations into practice (Bromley 1992).

It has been suggested by Aswani (2002) that there have been insufficiently quantified variables to illustrate the actual circumstances that translate resource user's governance into practice. The community's historical processes and their outcomes should be identified and measured before one can understand the implications of population and consumption growth on customary marine tenure. In addition, (Aswani 2002) asserts that customary marine tenure in the Solomon Islands is robust enough to withstand demographic, economic, and political transformations.

However, Aswani (2002) does note that the recent economic and political tensions in the Solomon Islands also put the customary marine tenure systems under pressure. The dire economic circumstances of the local people have caused some to abandon or overlook some customary marine tenure rules. There is evidence of increasing commercialisation of certain common property resources (for example, the coastal fisheries) as the confidence in the central Government became unstable. Many that have fled the recent ethnic tensions (2000-2003) have returned to their respective homes. This has caused population to increase in the villages. But most of the people who return lack traditional knowledge about marine resource management or do not value traditional practices.

Although customary marine tenure has been affected by various factors, some authors (e.g. Johannes 1998, Ruddle 1998) have argued that since customary marine tenure identifies with some principles of

common property institutions such as boundary demarcation, activity monitoring capacity and conflict resolution mechanisms and strategies, it can be integrated with government regulations to safeguard marine resources. However, Aswani (1999) argued that there is a need to go beyond this perception to understand and take on board the institutional arrangements of customary marine tenure in order to attain effective management. In the Solomon Islands, neighbouring customary marine tenure systems often seem similar in terms of their rules governing use and access. Research by Hviding (1996) and Aswani (2002) pointed out that the translation of these governance rules into actual management practice depends on the historical, socio-economic, political and environmental conditions within which it is embedded.

Townsley et al. (2001) argue that customary marine tenure, until very recently, has had little to do with the conservation of marine resources, at least, in the minds of the local resources-users. However, this may not disqualify it from being a valid instrument for marine resource management. Traditional management measures adapted for conservation purposes are often ignored by resource-users than equivalent measures imposed for customary purposes, such as marking the death of a chief (Townsley et al. 2001). Therefore the exercise of customary marine rights makes sense in its own cultural context for customary purposes, but does not necessarily make sense when conservation rationale is added.

In summary, research specifically focused on the Solomon Islands suggests that the key factors influencing customary marine tenure regimes are colonisation, technological modernisation and integration into global economy. In addition, Aswani (1999) argues that recent internal conflicts have had a particularly disruption effect. However, whether any or all of these influences hold true in remote Temotu Province has not been investigated. This research should shed some light on the factors influencing customary marine resources management, at least from the point of view of the local inhabitants in the three case study villages in Temotu province.

4.6 Centrally-based and partnership-based marine resource management regimes

Aside from customary marine resource management under customary marine tenure, the other two marine resource management regimes practised in the South Pacific, including the Solomon Islands, are centrally-based and partnership-based (co-management). These management regimes reflect colonialism and modern bureaucratic systems of government (centrally-based management) and the recently popular alternative management regime to the former (co-management). Before turning to the thrust of this thesis, it is useful to review these alternative regimes, albeit in broad terms.

4.6.1 Centrally-based marine resource management

This regime is analogous to the state property regime (Bromley and Cernea 1989; Feeny, et. al. 1990; Berkes 1994) and reflects colonialism and the modern bureaucratic system of government. Centrally-

based fisheries management refers the government being solely responsible for the management of the fisheries (Pomeroy 1995). This regime is an introduced form of marine resource management in the South Pacific, based on the notion that the government can “do it better”. Pomeroy (1995) notes that while many fishing communities in the South Pacific, still maintain some level of informal or traditional management system, fisheries management, by and large, is a governmental function. It is the Central Government that has to secure the nation’s right to fisheries from other potentially competing nations. Under UNCLOS, the Government must show that its nation’s fisheries and marine resources are sustainably managed (Beeby 1975). It seems that in combination with colonial heritages, international responsibility tends to lead nations towards centrally-based administrative structures for fisheries.

Under a centrally-based marine resource management regime, the government is responsible for the management of coastal fisheries resources, including the promotion of their development (Dalzell and Schug 2002, Bromley and Cernea, 1989). Governments introduce fisheries legislation to manage their fisheries resources. Rules and regulations are imposed by the government authorities with very little or no input from other important stakeholders such as the fishing communities. In most cases, this regime has been proven to be a failure in the South Pacific (Fa’asili 2002; Johannes 1998b; Pomeroy 1995). There are several reasons for the failures. First, the community is given no ownership (since they have no input) of either the resources or the problem and therefore have little responsibility or accountability. Second, regulations tend to lack legitimacy in the eyes of rural communities. Third, given the realities of the common constraints amongst the island nations, in terms of finance, human resources and weak central authority, regulations are often difficult to enforce. Fourth, it has been recognised that a fishery cannot be managed effectively without the cooperation and participation of fishers to make laws and regulations work (Pomeroy and Berkes 1997). As a result there has been little impact on the management of the fishery resources and marine environment under this regime.

4.6.2 Partnership-based (co-management) marine resource management

In recognition of the shortcomings of both centrally-based and traditionally-based management of marine resources and the pressing need for management of coastal fisheries in many of the Pacific Island nations, alternative management models have been proposed that recognise the traditional role of village communities in allocation of fisheries resources (Adams 1998, Johannes 1998b, Ruddle 1998, Johannes 2002). While the virtues of community-based management generally have been applauded, there is acknowledgement that the community capacity to effectively manage coastal fisheries is vulnerable to both external and internal influences (Johannes 1998, Ruddle 1998, Aswani 1999). It has been suggested that in many areas customary marine tenure might benefit by embedding the framework of co-management and vice versa. A partnership-based management (or co-management) regime has been recommended that would, arguably, solve the problem of overexploitation and degradation of marine resources and environment (Johannes 2002). Essentially,

partnership-based marine resource management is a synthesis or combination of centrally-based and community-based management regimes.

The basic underlying tenet of partnership-based marine resource management is the mutual sharing of management responsibilities between the local community and national government or its agencies (Johannes 2002). This means the resource users or the community, through customary rights, and the government are responsible for the management of marine resources (Pomeroy 1995, Johannes 2002).

The basic argument for the adoption of partnership-based marine resource management regime is that since marine resources are mainly used at the community level, participation and input by local communities is necessary in marine resource management. This is lacking in a centrally-based marine resource management system.

Proponents of partnership-based marine resource management argue that such a management regime is suitable for the following reasons. First, it enhances management efficiency. Vesting of fishing rights at the community rather than the national level has provided a non-regulatory incentive for fishers to conserve marine resources, thereby lowering the costs to governments of achieving resource management goals (MacGoodwin 1990; Johannes et al 1991). Both authors argue that customary marine tenure provides culturally sanctioned rules for allocating marine resources equitably, apprehending and punishing transgressors and adjudicating disputes. Often this is without recourse to government and thereby greatly reducing administrative costs.

Second, it contributes to rural development and local autonomy by giving an opportunity for the local leaders to have greater autonomy over decision making, control, regulation and management of their marine resources. For instance, proponents of customary marine tenure argue that such a management regime provides the means of community control and access to limited natural resources, but need the support of Government in areas such as enforcement. Customary marine tenure is seen as a key to maintaining the sustainability of coastal fishery harvest and the benefits of well-managed resources (Johannes et al. 1991).

The third reason is that it reinforces cultural values. The management regime contains and maintains socio-cultural aspects from which it emerges and continues to be important.

Customary marine tenure is often recognised as the basis for a partnership framework. As Johannes (1993, p. 48) pointed out, “customary marine tenure forms an important part of the framework for social and political relationships and defining cultural identities in cultures where individuals and society are often looked upon as integral parts of nature. The physical, economic and spiritual life of island communities is thus centred on their natural resources assemblage and the resource space

containing it". The partnership or co-management strategy is based on four principles: maximum community participation, motivation and support for the communities, a management system which is demand-based and the development of alternative sources of sea food (Fa'asili 2002).

Several countries such as Vanuatu, Samoa, Fiji, Cook Islands, Palau, Hawaii, Kiribati, and Tonga have adopted partnership-based management regimes (Johannes 2002). However, other countries have not adopted partnership-based marine resource management although they have initiated the process. The Solomon Islands is a case in hand where the legislation recognises customary tenure for the management of subsistence fisheries, but generally the marine resource management still appears, by and large, to be a formal central government role.

4.7 Livelihoods dynamics

It is critical to this research to recognise that customary tenure and management of marine resources and the factors influencing them are fundamentally manifested through livelihoods of the rural coastal villagers. There are many definitions of livelihoods, but according to Chambers and Conway (1992, p. 6) "a livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stress and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base". Chapter 5 (section 5.4) contains detailed discussion on the Sustainable Livelihoods Approach (SLA), including its components, determinants and weaknesses.

Understanding the diverse and dynamic livelihood strategies is important so that interventions, if any, are appropriate (Ireland 2004). Livelihoods are complex, evolving and influenced by a wide range of external forces within and outside the household and the village (Soussan et al. 2004, Ireland 2004, Frankenberger et al. 2002). Livelihoods are based around a wide range of activities. It often involves complex strategies that seek to maximize the use of the bundle of resources available to them (Ellis 1998).

Influential external forces are often largely beyond the control of the household. Such forces (social, economic, political, legal, environmental and institutional in nature) are critical in defining the basic structure and operation of livelihood systems. For example, land tenure arrangements determine entitlements and access to land for cultivation purposes, and price variability determines production decisions of farmers (Frankenberger et al 2002).

The external forces are themselves not static, but dynamic. It is their dynamics, the process of change in the wider economic, social and natural environment, that create the conditions in which livelihoods change. These changes can be longer-term trends or sudden shocks. The external shocks together with

the trends directly affect the decision making environment and the outcomes of livelihoods, and provide the vulnerability context. The effects vary in degree and extent. Some studies, for example Rennie and Singh (1996), cited in Soussan et al (2004), suggest that in general the more affluent and asset-rich the household, the more options it possesses in the face of shocks, and therefore, the more resilient it is to disruption to its livelihoods base. In the same token, external shocks on the vulnerable and poor lessen their ability to plan for and withstand further shocks. In such situations, strategies of the poor to avoid these shocks often are both *ex ante* as risk minimization strategies and *ex post* as survival, or coping strategies.

Rennie and Singh (1996) also identify the responses to such threats as either adaptive strategies (where a household consciously adopts a process of change in response to long-term trends) or coping strategies (short-term responses to immediate shocks and stresses). They argue that, in these circumstances the household will seek to deploy their different assets to the best effect within their often limited range of choices. This set of choices is again conditioned by the wider context within which they live, and in particular, by the extent to which they can control the key decisions that affect their lives.

4.8 Gender and fisheries

Both men and women engage in fishing. Women including children largely engage in reef gleaning (Aswani 1999, Hickey 2006). Their contribution to household food supply is very important. The role of women is often ignored in economic and social studies (Bennett 2005).

While marine resource management is documented in the Solomon Islands, the gendered role towards marine resource management has rarely been explicit in the literature. Studies elsewhere in the world suggest that the role of women in marine resource management has been rarely valued on an equal par with that of men (Bennett 2005).

The triple role and Harvard Analytical gender frameworks are employed to inform the study, specifically because it's usefulness to gain understanding and insights into the dynamic nature of gender in relation to fishing, women's productive and reproductive roles, access to marine resources and power relations within the three case study villages. Gender analysis frameworks are further discussed in chapter 5 (sub-section 5.4.2).

4.9 Chapter summary

The literature reviewed has provided insights and understandings into customary marine resources management regime under customary marine tenure. Customary marine tenure is a form of tenure system found in the South Pacific where indigenous communities define their rights to marine resources in their marine areas. It is commonly regarded as a traditional form of marine resource

management. Customary marine boundaries are often demarcated by physical landmarks. The rights to use, access and manage the resources are in the hands of the people within the marine boundaries.

Traditional management under customary marine tenure employs a wide range of traditional marine resource management practices. These include fishing closures, privileged-user rights, species-specific prohibition and seasonal closures. Various factors affecting the customary marine tenure system have impacted on these practices. These traditional practices are contained in the villager's corpus of traditional knowledge and, arguably, the traditional practices are expressions of that traditional knowledge. Traditional knowledge is important but on the decline due to internal and external factors affecting customary marine tenure. With the notable exception of the Western Province, the factors influencing customary marine tenure in the Solomon Islands have received limited attention in the literature.

Some authors argue that customary marine tenure is no longer effective unless supported by the government or responsible bodies. Others argue that it is capable of withstanding these changes because traditions within which customary marine tenure exists are dynamic. They argue that it can, therefore, adapt to the changes brought about by its circumstances and has relevance in other marine resource management regimes such as partnership-based (co-management) marine resource management regimes.

The SLA is an approach that focuses on the people and their livelihoods. The sustainable livelihoods framework is an important analytical framework to understand the livelihoods of the people. The Sustainable Livelihoods Framework consists of livelihood assets, institutions, policies and processes, livelihood strategies, outcomes and vulnerability context. This framework has relevance to understanding the coastal resource management and the livelihoods of the people who depend on it. While there are many studies on factors affecting marine resource management, these studies vaguely discuss customary marine resource management in the context of the Sustainable Livelihoods Framework. This study should fill this void.

The literature presented above and the theories used to inform this research are instrumental towards answering the research questions.

The next chapter, Chapter 5, outlines the research methodology and the practical methods of data collection and analysis employed during field work.

Chapter 5: Research Methodology

5.1 Introduction

This chapter outlines the research methodology. Specifically, it presents the research approach, strategy and methods of data collection employed in the study. The research design and research field procedures (protocol) are also discussed, including the sampling and triangulation strategies. The constraints encountered during fieldwork and the ethical considerations are also discussed. As noted in the previous chapters, the research is fundamentally about livelihoods and the changes in livelihoods in relation to marine resource management. Consequently, a sustainable livelihoods framework is the fundamental methodology chosen for the research.

5.2 Qualitative research

This research is, by and large, qualitative (inductive) research. However, some quantitative data were collected as supporting evidence.

The choice of qualitative research using three case studies for this research was due to the fact that the research is descriptive, exploratory (discovery) and explanatory in nature. The descriptive, exploratory and explanatory nature of the research is associated with the how, what and why questions respectively. The research is descriptive and exploratory because it attempts to describe and explore the phenomenon under study, rural coastal livelihoods and customary marine resource management under customary marine tenure. The intention was to gain a rich understanding of the phenomenon studied in their natural setting. While explanatory questions are more related to quantitative research (Yin 2003), this study seeks to explain the phenomenon under study from the emic perspective, which is from the research participants' lived experiences and explanations. As the researcher, I have gone out into the field with as open a mind as I can maintain to study the phenomena in their natural settings.

Moreover qualitative research is appropriate because it can be used to better understand any phenomena that are not known. Qualitative research is ideal when one wants to gain in-depth information that may be difficult to convey using quantitative research. The philosophy of qualitative research is based on naturalistic inquiry, inductive analysis, holistic perspectives, personal contact and insight, unique case orientation, context sensitivity, emphatic neutrality and design flexibility (Patton 1990, 2000). The natural settings of the phenomena under study are studied as they are, and as they unfold through the research process. As the researcher, I did not have control over the research setting. The inductive nature of qualitative research has made it possible for the study to begin with general themes and builds towards unveiling specific patterns.

Qualitative research is also used because the study seeks to capture the holistic nature of the phenomena under study from the lived experiences and insights of the research participants. Moreover, the flexible nature of qualitative research enables continual refinement and modification of the methods of data collection used throughout the research process. The inquiry was therefore open to changes as the new insights and knowledge emerged.

Role of the researcher

In qualitative research the role of the researcher is very important because the researcher is the instrument of data collection. The role of the researcher has important implications for the research output. The role of the researcher is associated with the concept of reflexivity (Steier 1991) and construction (Woodford 2006). In the case of this research, the qualitative research paradigm is the general methodological paradigm within which this study was conducted. The specific methodological paradigm within the qualitative research genre within which the research was conducted is the constructivist-interpretive paradigm. This specific paradigm is discussed in Section 5.3 below. The constructivist paradigm is based on constructs (Woodford 2006).

Glaser and Strauss (1967) and Strauss and Corbin (1990) talk of the ‘theoretical sensitivity’ of the researcher which essentially refers to the personal quality, ability to give meaning, and capacity of understanding of the researcher. The sources of theoretical sensitivity can be experiences (personal and professional) and literature. A qualitative study must be carefully designed since there is lack of standardized procedures. The design of this case study is provided in Section 5.6. Much will depend on the ability of the researcher. This study employed triangulation and persistent observation of the research participants as the key techniques for ensuring reliability and validity of the data and field work (Lincoln and Guba 1985, Patton 1990, 2002, Abbot, n.d.). Since the case study approach was used generalization will be limited to the cases study villages, except where they can be related to studies already reported in the literature.

5.3 Constructivist-interpretive research methodology

In this research the constructivist-interpretive paradigm employed involved processes of talking to people, getting their stories, interpreting the stories and constructing an understanding of the situation. The choice of this paradigm is due to the fact that the basic aim of my research is to understand inductively and to synthesize the constructions that the villagers hold regarding rural coastal livelihood and coastal marine resource management under customary marine tenure.

The ‘constructivist’ aspect reflects the belief that humans individually and collectively construct reality. These mental constructs are socially based and also based on life experiences. Through an interactive process, the research makes sense of the findings. A consensus is reached comprising the detailed emic and etic views of the phenomena under study (Patton 2002). In this case the research

participants hold the social constructs about the phenomenon under study. While constructivism reflects that humans individually and collectively construct reality 'Hermeneutics' focuses on the meanings and interpretations of what could be said about the reality constructs. 'Hermeneutics' is related to phenomenology and is based on the view that truth is not certain and invariable and that by exploring interpretive contexts and interpretations truth can be made meaningful (Rundell 1995, Liamputtong and Ezzy 2005). The 'interpretive' aspect stresses the need to put analyses in context, presenting interpretations of many, sometimes competing groups of views.

This constructivist-interpretive paradigm is complemented and sensitised by livelihood frameworks, and gender and development theories.

5.4 Theoretical lenses (frameworks) of enquiry

5.4.1 Sustainable livelihoods approach (SLA)

Given the fact that this research seeks to gain insights and understanding into the nature of the relationship between the coastal rural livelihoods and marine resource management, the SLA is an appropriate lens through which to conduct the inquiry as it is holistic in nature. It has formed the key part of the research process, by providing an analytical framework, the Sustainable Livelihoods Framework, against which the research questions relating to the participants livelihoods are framed.

The discussions in Chapter 4 have drawn attention to the changes occurring at community level, the disability of community engagement or involvement and the potentially significant impacts and disruptions caused by modernisation and economic development. At the community level, Aswani (1999), in particular has drawn attention to the need for more clarity and detailed examination of the nature of the changes at the community level. The sustainable livelihoods framework is a useful lens with which to identify the components comprising rural livelihoods systems so that changes in them can be examined. It recognises the diversity of livelihoods and livelihoods strategies, and also the importance of sustainability. Understanding the components of the framework and the relationship between them is necessary. In order to understand the importance of the relationship between marine resource use and management in the past, questions relating to the elements that have made up the people's livelihoods were asked.

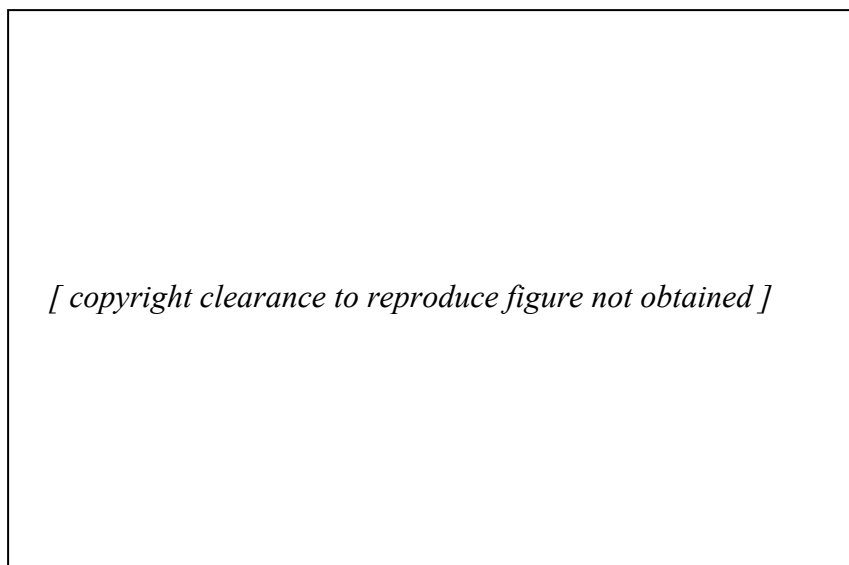
Livelihoods frameworks

The sustainable livelihoods framework developed by Scoones (1998) was the first formalised sustainable livelihood framework and was adapted by the Institute for Development Studies (IDS). Since its inception into mainstream development approaches, the Sustainable Livelihoods Approach has been adopted into different applications and altered in an effort to improve livelihood analysis (Woods 2006). Other Frameworks have built on the IDS Sustainable livelihoods Framework and share basic characteristics and components (e.g. DFID 1999, Peach and Townsley n.d, Drinkwater and

Rusinow 1999, Carney 1999, Ellis 2000, Odero n.d, IMM 2003, the Soussan et al 2004, Ireland 2004, Maru 2001, Maru and Woodford 2005 and Cahn 2006). A recent detailed critique of the SLA has been undertaken by Liu (2006) and McFarlane (2007). The detailed expositions of these frameworks are contained in the above cited references.

Basic components of the Sustainable Livelihoods Framework

The basic components of a Sustainable Livelihoods Framework consist of livelihood assets (or capital), policies, institutions and processes (or transforming structures and processes), livelihood outcomes, vulnerability context, and livelihood strategies (Figure 10).



(Source: DFID 1999, p.11)

Figure 10: Sustainable Livelihoods Framework

The DFID framework depicts assets in the form of a pentagon which highlights the five spheres that make up a group or an individual's capital (interchangeably used with assets). The five capitals which are defined by DFID (1999) are as follows: natural, social, human, physical and financial. Additional capitals which are not depicted in the DFID framework include information capital (Odero n.d) and cultural capital (Cahn 2006). McFarlane (2007) argues that cultural capital should be in the centre of the capital pentagon as the other components only show aspects of it.

In brief, natural capital refers to the natural resource stock which can be tangible, for example atmosphere, and intangible, for example land and marine resources. They are important because they form the basis of human survival. Financial capital, in this context, refers to the financial resources that people use to achieve their livelihoods objectives. Available stocks (e.g. cash, bank deposits, and liquid assets) and regular flows (e.g. remittances) of money are the two sources of financial capital. This asset is said to be least available to the poor, therefore making the other types of capital important to them. Producer goods (e.g. tools and equipments) and infrastructure (e.g. roads) comprises the

physical capital. Affordable transport, secure shelter and buildings, adequate water supply and sanitation, clean, affordable electricity and access to information (communication) are the essential components of physical capital. Physical capital is also important for livelihood sustenance. The skills, knowledge, ability to labour and good health together represent the human capital. Human labour is regarded as an asset and is necessary in order to make use of the other types of capital, though on its own it may not be sufficient.

There are different views on what social capital represent but here it is taken to mean the social resources that people draw on when pursuing their livelihood aspirations. These are developed through networks and connectedness, membership to groups, and relationships of trust, reciprocity and exchanges. These are inter-related. Social capital is said to be more closely related to transforming structures and processes and human capital than the other types of capital. It can have direct implications on the other types of capital by improving economic efficiency of economic relations, reducing free rider issues frequently associated with management of natural resources and, through social networks, their can be innovations, development and sharing of knowledge (DFID 1999). Social capital has received considerable attention in fisheries management literature with several authors arguing that it is the key to sustainable community-based or partnership regimes for fisheries management (Arrow 1972, Ostrom et al. 1994, Jentoft et al. 1998, Narayan 1999, Paldam 2000, Putman 2000, Woolcock 2001, Adams et al. 2003, Grafton 2005) .Cultural capital refers to the way the people do things and the products of what they do. These are often associates with cultural values and traditional beliefs of the people. Information capital refers to the wealth of knowledge that the people possess. This information is important in maintaining and enhancing the other livelihood components.

According to Ellis (2000) assets are the cornerstone to the understanding of options available to the poor, the strategies they adopt to attain livelihoods, the outcomes they aspire to and the vulnerability context under which they operate. A necessary analysis of assets is in relation to what people have and do not have rather than what they need. The analysis of assets is about how access to assets has changed over time, what changes are predicted, what causes the changes, and how access and control differs between social groups (Carney 1999).

According to DFID (1999) assets endowments are constantly changing, therefore constantly shifting. That is each asset continues to change over time, and it is imperative to incorporate time into any analysis of assets. Trends in overall assets availability, which groups is accumulating, or not and why is important information. The assets are related to each other. Sequencing and substitution are the key two types of relationships. “Sequencing” refers to which type of asset the people began with or rely on most, and “substitution” refers to if one type of capital can be replaced by the other(s). Assets not only relate to each other but also to the other components of the Framework. The relationship between

livelihood assets and vulnerability contexts is very close. Assets are destroyed and created by the livelihoods vulnerable context. Assets are also created, determined and influenced by transforming structures and processes. Having more kinds of different assets can provide greater ranges of livelihoods strategy options and opportunities to switch between multiple strategies thereby may reduce livelihood vulnerability. Different assets are required for different livelihood outcomes.

Structures are essentially government entities (national and local) and private organizations. Processes refer to laws, regulation policies, power relations, societal norms, markets and incentives. Structures and Processes complement each other and are important because they influence the access, control and use of resources as well as returns to livelihood strategies. They also provide the link between the micro (individual, household, and community) and the macro (regional and national) levels (Ellis 2000). An understanding of the structures and processes helps identify areas where restrictions, barriers or constraints occur and explain social processes that may have a bearing on livelihood sustainability (Scoones 1998).

The livelihood strategies are composed of activities that provide the means of household survival or living (Ellis 2000). Depending on the assets that the people have the structures and process that impact on them, tradition, and the vulnerability context under which they operate, people choose livelihood strategies that will best provide them with livelihood outcomes (Cahn 2006). Livelihood strategies change as the environment changes. The people may have very little control over these changes. Often people pursue unsustainable and unproductive livelihood strategies because of either tradition, lack of an alternative resource base or as a coping strategy in difficult situations. Scoones (1998) identifies three types of rural livelihood strategies: agricultural intensification or extensification, livelihood diversification including both paid employment and rural enterprises, and migration (including income generation and remittances). Carney (1998) lists these categories of livelihood strategies as natural resource based, non-natural resource based, and migration, while Ellis (2000) categorizes livelihood strategies as natural resource based activities and non-natural resource based activities (including remittances and other transfers).

Livelihood outcomes include increased income levels, improved well-being, higher levels of satisfaction, reduced vulnerability, improved food security, and more sustainable use of the natural resource base. They are actually the result of livelihood strategies. Livelihood outcome objectives differ depending on who is involved. According to DFID (1999), understanding livelihood outcomes is necessary to alleviate poverty.

People's livelihoods and their access and control of resources can be affected by events largely beyond their control. This is the concept of vulnerability. Vulnerability can be viewed in two contexts: the external environment in which people exist and how people adapt to, and cope with stresses and

shocks (DFID 1999, Chambers and Conway 1992). The reason for analyzing vulnerability is to assess and improve resilience while ensuring lesser exposure to risk (DFID 1999).

Sustainable Livelihoods Approach weaknesses

Though very appealing to assess livelihoods and in development interventions, the sustainable livelihoods approach also has weaknesses that have been well explored (e.g. Cahn 2006, Liu 2006, Dorward 2001, and Dorward et al. 2003). In relation to livelihoods analysis, key critiques are that: it is too complex and that it may be inappropriate for some sectors; markets, institutions and technology are the missing links in livelihoods analysis; role of the private sector is often excluded (Dorward 2001, and Dorward et al. 2003); and culture (Cahn 2006), informational capital, tradition and indigenous knowledge (Ordero n.d) in most frameworks. The dynamics of the frameworks, the social and political dimensions and the linkages between micro and macro levels are also questionable (Liu 2006).

However, according to Cahn (2006), the SLA is people-centred, dynamic, participatory, and holistic, and focuses on sustainability. It is a positive approach in that it first identifies what people have rather than what they do not have. It also recognizes diverse livelihood strategies. Singh and Gilman (1999) and Farrington et al (1999) point out that the sustainable livelihoods frameworks are useful analytical structures for understanding the reality of the poor and the complexity of rural life.

Livelihoods systems and determinants

There can be many livelihood systems and they can vary depending on the environment. For example, livelihoods systems may be different between urban and rural areas or between coastal and inland areas. Even within rural areas there may be different livelihood systems. Some systems are sustainable while others are not.

The diversity of livelihood systems can give rise to a diversity of livelihood strategies. Based on my own experiences, personal observations and exposure to pertinent literature some of the livelihood strategies at the Solomon Islands village level include: shifting cultivation (subsistence agriculture), sale of garden produce, hunting, fishing, fruit gathering, remittances, wood carving, mat weaving, micro-enterprise, micro-credit, tourism, and basket weaving. In fact, Ireland (2004) explicitly lists many possible livelihoods strategies that people can rely on.

The Sustainable Livelihood Framework is an important tool to understand the livelihoods of coastal villagers. It also has relevance to natural resource management such as marine resource management (Ellis and Allison 2001, Asong et al. n.d, Navy et al. 2006, Allison and Horemans 2006). However, while many literatures have focussed on the factors that have affected customary marine resource management, there is little that specifically focuses on the interaction between livelihoods and

customary marine resource management in the South Pacific. Little about the actual application of the SLA approach in fisheries development programmes and management has been documented, but it has been argued that using SLA principles is necessary and important for better resource development policy and management practice (Allison and Horemans 2006).

This study recognises the relevance of SLA in marine resource management and has chosen the SLA as its methodological approach.

5.4.2 Gender and development theories

The other framework utilized in the study is the gender analysis framework. The two common frameworks for gender analysis are the Harvard method and the triple role framework (Moser 1989). Livelihoods in the Solomon Islands have traditionally incorporated gendered roles. A particular weakness in much literature on fisheries management has been relation to gender issues. To understand the gender aspects of marine resource management, this section addresses three things: gender roles, gender and fishing, and gender and marine resource management.

Roles

To understand gender roles two the triple role framework and the Harvard Analytical Framework are used. The triple role framework states women's work into three main categories; the productive, reproductive and community work (Moser 1989, cited in Oxfam 1994). While men and women are involved in productive work, their functions and responsibilities may differ according to their division of labour. Women's productive work is often not as accounted for or as visible as men's. Productive work involves the production of tangible goods and services for sale and consumption. Reproductive involves the care and maintenance of the household and its members. It also includes other things such as bearing and rearing of children, shopping, food preparation, house keeping and health care of the family. Though crucial for human survival and fundamental to livelihoods, reproductive work is often not considered as "real work" (Oxfam 1994). This kind of work is often seen as the work of women and girls. The collective organization of social events, goods and services such as village ceremonies, cleaning the church or schools and so on are referred to as community work. Community work is seldom considered in economic analysis, yet involves considerable volunteer time by the community members. It is also an instrument for community organization and self-determination. Both men and women engage in community work but gender division of labour still applies.

Elements of the Harvard Analytical Framework are also appealing to the study. The framework comprises of four inter-related components. They are the activity profile, the access and control profile, factors influencing activities, access and control, and project cycle analysis. In this study, the first three components are used to complement the triple roles mentioned above. The activity profile refers to gendered activities done by the people. The access and control profile identifies who has

access to productive resources such as marine resources, who has control over these resources and who benefits from them. The factors affecting the activities, access and control over productive resources, are also important. The factors may include gender division of labour, cultural beliefs, and process, among others. They can create different implications on men and women in terms of opportunities available to them and constraints on both of them (Oxfam 1994).

My position as a woman and a mother in conducting this research will possibly change the perception on what women are culturally capable of. While there may be little or no implication on Santa Cruz Islanders' culture, I anticipate a positive contribution to the management and development of their marine resources and livelihoods.

5.4.3 Kaupapa Maori Research (KMR)

While this research did not take place specifically within a Maori cultural context, several aspects of KMR were appealing to my study. Mead (1996), cited in Waters (2006, p. 36), identifies a number of the KMR aspects which I have taken into account during fieldwork. These include:

- Aroha ki te tangata (a respect for people)
- Kanohi kitea (to present yourself face to face to people)
- Titiro, whakarongo, korero (look, listen, speak)
- Manaaki ki te tangata (share and host people, be generous)
- Kia tupato (be cautious)
- Kaua e takahia te mana o te tangata (do not trample over the status of the people)
- Kaua e mahaki (do not fault their knowledge)

These aspects of KMR were specifically important for my research because my research involved interviewing people. I am familiar with the culture of the three villages but I am subjected to particular constraints and cultural bias, some exogenous and endogenous to me. The KMR served as a reminder of what values I needed to be aware of throughout the field research process while I was in the villages. Overall, I had to fit with their timetable and was not seen to be dictatorial.

5.5 Research strategy

This study employs a comparative case study strategy within the qualitative genre. While the research is qualitative in nature relevant quantitative data were also collected to supplement qualitative data and aid in triangulation and interpretation.

5.5.1 Case study as strategy of research: Theoretical basis

A case study in this context refers to an “empirical inquiry that investigates a contemporary phenomenon within its real-life context when the boundaries between phenomenon and context are not clearly evident and in which multiple sources of evidence are used” (Yin 1989, p. 23). A case study is

suitable because it is instrumental to provide insights and in-depth understanding of the complexities of the phenomena under study focusing on process and discovery (Babbie 2004). They are a preferred strategy when the research focus is on contemporary phenomenon within a real-life context (Burns 2000, p. 460). Specifically the study explores, explains and describes the interactions and relationships between rural coastal livelihoods and customary marine resource management under customary marine tenure.

A comparative case study (Stake 1994, Thomas 2003) was employed to aid the richness of the data. Moreover, a multiple case studies for this research is advantageous in that the evidence pertaining to the phenomenon under study can be more compelling between the cases (Burns 2000) and comparison can be made about the phenomena under study enabling greater diversity of views and improved possibilities of triangulation. The research explores, describes and explains the phenomena under study over different localities (three villages) within the same area (Santa Cruz Islands group).

5.6 The case study design

According to Yin (1994), there are five components of a case study design. They are research questions, study propositions, unit of analysis, the logic linking data to the propositions, and the criteria for interpreting the findings.

Research questions

The main research aim and questions were outlined in Chapter 1.

Propositions

The proposition is that an inductive case study approach, operating within the lenses (SLA and gender frameworks) chosen, applied to the three case study villages will reveal data that will aid in answering the research questions. I have gone out in the field with an open mind. However, from the literature review and my personal experiences, a checklist of research questions (Appendix 1) was drawn up as a guide for interview questions. These interview questions were kept unstructured and open-ended with prompts attached to ensure information intended to be obtained was captured.

Unit of analysis

Among many others, a unit of analysis can be meanings, practices, organization, village, household and individuals (Liamputtong and Ezzy 2005). In exploratory studies a number of units may concurrently emerge in the process of data collection. In this study the village is the unit of analysis. However, it is important to note that within the village there are households which in turn constitute families and individuals. Therefore, while the analysis focuses on the village, as much as possible the households, families and individuals are accounted for in the data collection process. The three case study villages are Venga, Graciousa Bay and Neo.

The three case study villages were purposively selected. This is a non-random sampling technique that is based on the use of pre-determined criteria to select the cases to be studied (Babbie 2004). A set of criteria was developed to aid the selection. The criteria were grounded on an information-oriented approach. The three case study villages were selected on the following criteria:

- 1) Remoteness. Temotu Province was purposively selected from the other provinces because it is isolated from the other parts of the Solomon Islands
- 2) Lack of studies. The nature of the relationship between marine resource management and livelihoods had not been studied previously in Solomon Islands.
- 3) Regional considerations. The villages are from the same region (Santa Cruz Islands and electorate) and therefore have a similar culture and political context.
- 4) Different localities. Neo village is on an Island called Termotu Neo, and Venga and Graciosa Bay are on the main Island of Nendo.
- 5) Location on the coast. All of the villages are located on the coast
- 6) Level of involvement in fisheries activities. The villages are involved in various fisheries activities and at different levels.
- 7) Demographic considerations. Population sizes vary between the three case study villages.
- 8) Practical considerations. Such considerations include time, safety and ease of communication (logistics).

Research participants from the three case study villages were also purposively selected. The research participants include fisher folks from the three case study villages, both men and women over 18 years old, village leaders, Government officials from the Ministry of Fisheries and Marine Resources, Ministry of Provincial Government and Rural Development and provincial government officials; private business enterprises involved in buying fishery products from the rural fisher folks for commercial purposes and those private businesses involved in selling fishing gear. The older village participants are over 40 years old and the young ones are between the age of 18 and 40. The reason for this was to capture the retrospective and current perspective on the phenomenon under study.

Snowball technique was used to select the village research participants. Once I got the permission from the village leaders to conduct research in the three case study villages, snowball techniques (Davidson and Tolich 2003) was used to shortlist village interviewees. Ten fisher folks were listed for each village. Having done this I approached a representative village leader and presented him the list of whom I intended to interview. I approached the villagers first before the village leaders to avoid bias that may be brought in by the leader. In the three villages, the leaders contacted have suggested additional names. There were four additional fisher folks from Venga and Neo village and six from Graciosa Bay. This situation was initially anticipated and was accounted for in my ethics application.

I interviewed all of them, that is, the fisher folks on my initial list and those suggested by the Villager leader. I have done this out of respect for them from a Melanesian cultural perspective.

Equal number of males and females were interviewed in the three villages. In Venga and Neo there were fourteen research participants (seven males and seven females). In Graciosa Bay there were sixteen research participants because there are more sub-villages than the other two. Eight males and females were interviewed. The rationale for having gender balanced selection was to capture the gender aspects of the interactions and relationship between livelihoods and marine resource management under customary marine tenure. In Venga and Neo two older research participants (male and female) and three in Graciosa Bay. The reason why older and younger research participants were picked was to capture retrospective and contemporary perspectives of the phenomena under study. Most of the older research participants no longer actively engage in fishing but have had experience in the past.

Apart from the village research participant I have interviewed village key informants who were also selected using the snowball technique. There were two key informants from each case study village, a male and a female. They were selected because they were deemed to be knowledgeable and had the ability to provide rich information about the past and present context of the phenomenon under study. One village leader from each village was also interviewed.

Four private business enterprises that purchase marine products were also interviewed. Three are in Honiara and one in Lata. While this study focuses on the village level management, information collected from this research participant category was useful to capture the marine product market scenario and the connection to village levels. Markets are also often mentioned as a cause of customary marine tenure deterioration. Informal conversations were conducted with business enterprises that were involved in selling fishing gear. The intention was to identify what kinds of gear they sell and why and what is the rate of their sales. One representative from these private business enterprises was chosen by their business. Two of the interviews in Honiara were conducted in their offices and two were at their home as their operations are based at their homes.

Government and fisheries officers were also interviewed. At the Ministry of Fisheries and Marine Resources, three officers were interviewed. The rationale for interviewing these officers was to understand the formal administrative structures' views on the issues under study. Upon arrival in Honiara, I contacted the Ministry and requested if I could interview relevant officers. I was given three names and their contact details and interviews with them conducted in their offices at a time they set. The Temotu Provincial Fisheries officer and one Provincial Officer were also interviewed. Due to communication difficulties I contacted these officers in person. Interviews were conducted in their respective offices.

In total, I interviewed forty eight research participants, inclusive of the fisher folks, key informants, private business enterprises and government and fisheries officers. List of the research participants are contained in Appendix 2.

Linking data to propositions is revealed in how the data was collected, analyzed and the conclusions drawn from the data address the research questions the study intends to answer.

5.7 Field research procedures

In accordance with standard case study procedures ((Yin 1994, Babbie 2004) I do not have any control over the research environment where the data were collected. I adopted a flexible approach to accommodate changes in the course of the data collection.

The basic field research procedures are contained in Appendix 3. Prior to the field research a field work timetable (Appendix 2) was drawn up. The field work took place from April to June 2007. Consent forms and information sheets (Appendices 4 and 5) were used in accordance with Lincoln University Human Ethics Committees research requirements.

5.8 Sampling strategies

The sampling frame, size and method are important considerations in any research. In this study the sampling frame are the three villages and the sampling unit is the individual research participants (fourteen from Venga and Neo, and sixteen from Graciosa Bay) I selected and interviewed. The sampling method refers to how the sampling frame and units are selected (FAO 2002).

Sampling method can be categorized broadly under probability- and non-probability-based sampling (Schaffer et al 1996). This study employed purposive sampling, under the non-random sampling domain, using predetermined criteria. The rationale for using purposive sampling was to select only those individuals who are the relevant stakeholders (fisher folks and village leaders, i.e. traditional and modern) in customary marine resource management. Their experience in fishing and management makes them a more representative sample.

The common errors which often arise in purposive sampling are distortions caused by small breadth and depth in sampling and changes over time (Patton 1990, 2000). My personal familiarity with the case study villages (I am from Venga) has helped me to ensure that the selected research participants were representative. Moreover, the number of research participants was sufficient to capture diversity within the villages. The distortion concerning “depth” of the sampling was counteracted through the use of other methods of data collection such as key informant interviews and observations (direct and participant). The key informant interviews have provided in-depth views on some areas that needed clarification or were insufficiently addressed in the semi-structured interviews.

5.9 Triangulation strategy

Triangulation refers to the comparison of data among different sources of information to improve its validity and reliability (Frankenberger et al 2002). To ensure the quality of the information, efforts should be made to build in a number of checks across data collection techniques.

Triangulation can be methods, data, theory, multiple, and investigator triangulation, including the design of the case study protocol (FAO 2002). Methods triangulation involves using various methods for collecting and analysing data. Data triangulation relate to various sources and data types. Theory triangulation is when various theories are used to explain and describe phenomena under study. Multiple triangulations involve several cases, and investigator triangulation is a situation where several researchers undertake the same research. This research employed methods, data, theory and multiple triangulations. Method triangulation was through the different methods used. Data triangulation was through the different sources and kinds of data collected. Theory triangulation was through consideration of different theories or literature on the same phenomenon studied. The usage of different forms of triangulation and three case study villages have resulted in a multiple triangulation. Although a research assistant was used his involvement was not sufficient to be considered as a form of investigator triangulation.

5.10 Methods of data collection and analysis

The data collection methods employed in this research includes semi-structured (participant and key informants), transect walk, observations (both direct and participant) and personal diaries.

Semi-structured interviews were the main methods of data collection for this case study. *Semi-structured interviews* were mostly used. In an interview continuum, semi-structured interviews are the middle ground between unstructured and structured interviews. A check list of interview questions was prepared before the field work commenced (Appendix 1). These questions were intended to guide the interviews and enable development of further areas of enquiry during the field research. Semi-structured interviews are particularly useful for this research because I intended to get detailed responses about phenomena under study from the research participants' points of view. Apart from the interviews with the individual research participants, key informant interviews were conducted. *In-depth interviews* with the key informants were conducted. The key informants, provided a rich source of information.

While the interview questions were open-ended, probes or prompts were used because it helped to fill in gaps in the research participants' responses to a question. Some probes were indicated under each interview question. Elaboration, continuation, clarification, attention, completion and evidence probes (Rubin and Rubin 1995, cited in Liamputtong and Ezzy 2005) were necessary in various interviews.

Participant and direct or non-participant observations were utilized in this research. In participant observation, the researcher is not a passive observer but actually participates in the events being studied. By actively participating, the researcher is able to perceive things from the perspective of an 'insider' (emic as opposed to etic or outsider view) (Burns 2000). In my case, where and when possible, I got myself involved in some activities such as going out fishing with village women to try and experience the situation myself. This occurred on several occasions. The major downside of participant observation is that the researcher may manipulate or alter events (Burns 2000). I attempted to ensure that my participation did not alter the natural settings and that there was no manipulation on my part of the natural occurrences of events. As far as I was able to tell, nothing took place during my participant observations that could be attributable solely to my presence, other than a greater deal of explanation and direct instruction than might normally occur.

On the other hand, direct observation involves the researcher visiting the case study 'sites' to just observe (Burns 2000). Thus it is an example of a less interactive method of data collection. It can be obtrusive if the observation results in different actions than would occur without direct observation. I attempted to observe the daily activities of the households and the community, including the environmental conditions while I was out in the villages. However, I did my write-ups of observations in private to minimise the chances that villagers would feel I was intruding into their lives. These might reduce the accuracy of my notes. They were based on recollection, but this is a minimum worry compared to alterations in observed behaviour due to being observed. *Field notes* were inputted in my diary during the entire course of the fieldwork.

After arrival in the three case study villages, the Research Assistant, a villager (female) and I took a *transect* walk around the villages. The aim was to explore the different physical features of the village. The transect walks were utilized to inform the interviews that followed. During the walk, notes were made on the important things seen, as well as unusual discoveries. Questions were asked of the villager who accompanied us.

5.11 Data analysis and Interpretation

There were two stages of data analysis in this study. The first stage involved data analysis of the individual case study villages and the second stage involved cross case analysis of the three case study villages.

The *individual case study analyses* were done in such a way that the results from the three case study villages were presented together as one. In this research the data analysis and interpretation techniques and process involved data reduction, data organization and display and then data interpretation (including verification and conclusion) (Lofland and Lofland 1995, 2006; Miles and Huberman 1994;

Davidson and Tolich 2004). Once the individual case study analysis were done, the cross case analysis commenced.

Data reduction

Data reduction occurred continually throughout the data analysis process. Once the data were collected, the interview tapes, field notes and diaries were transcribed into computer files. Some secondary data were summarized.

Both qualitative and quantitative data collected were coded. At the outset there were no prescribed codes, but I have let the data suggest the initial set of codes to identify the “emerging themes” from the data/information. This has set out the basis for a later coding scheme which was used or added to as appropriate for subsequent transcriptions of data. While coding, care was taken not to lose richness of the data. Memos were written to tie together the themes and identify the links between the themes that emerged. The themes that have emerged have influenced the subsequent data collection in terms of how questions were asked and orders of questions while retaining an open mind through the process. These themes also aided in modifying the questions appropriately, when required. The themes that emerged were threaded together to ascertain the core themes.

I categorized the research participants into four groups, the fisher folks, key informants, Government Officers (Provincial and National) and the Business enterprises. I have used pseudonyms instead of the research participants’ real names to ensure confidentiality. The three villages were labelled; ‘A’ for Venga, ‘B’ for Neo and ‘C’ for Graciosa Bay. In terms of the village research participants, I listed their names by the village they come from, whether they are ‘old’ (O) or ‘young’ (Y), and whether they are male (M) or female (F). For example, if Mr. X was the first old fisher folk I interviewed in Venga village, then by using pseudonyms I refer to him as ‘AMO1’. ‘A’ means that the fisher folk is from Venga, he is a male (M), he is old and he was the first to be interviewed in Venga village.

As for key informants, I have referred to them as ‘KI’ to mean key informant. For example, AKIM means that the KI informant is from Venga and he is a male. There were five Fisheries Officers interviewed, three from the Ministry of Fisheries and one from the Fisheries Extension Office in Lata. The Fisheries Officers are labelled ‘F’. The Ministry is given initial ‘N’ to represent national and the Provincial Extension Officer was labelled ‘P’ for provincial. As an example, FN1 means the Fisheries Officers is from the Ministry and he was the first one to be interviewed at the Ministry. And if it is written as FP, it means the Fisheries Officer is at Lata. The business enterprises were labelled as BE and were given numbers from one to four as four business enterprises were interviewed.

Data displays

Data displays involve organizing, compressing and assembling the information (Lofland and Lofland 2006). Once the data was collected, they were displayed in different forms. There are many ways of displaying data. They include graphs, charts, networks and diagrams of different types. In this study, the emergent themes (final stage) were categorised under main themes that came out of the research. Following this, a diagram illustrating the relationships between the emergent themes and key phenomenon under study was drawn up. Once this was done, relevant information from the transcriptions were inserted under each of the components that they come under in the diagram. Some of the qualitative data were tallied and represented in a table. Some were represented in graphs. The most useful and relevant diagrams, table and graphs have been reproduced in this thesis.

Conclusions drawn from data

Having all the data organized and displayed in an orderly form, there was reflection on the overall data gathering process in order to try and ensure that all the information from the participants were not misinterpreted. This was to clarify and confirm the findings. Following this, the next step involved tying threads to all the main themes drawn from the qualitative data, and the few quantitative results, to come up with conclusions for the individual case study villages.

A multiple comparative case-study design necessitates a cross-case analysis. After the three case study villages were studied individually, a *cross-case analysis* was undertaken. The aim of the cross-case analysis was to compare the three case study villages to ascertain similarities and/or differences; and to gain further insights to the entire phenomenon under study.

5.12 Ethical considerations

The ethical considerations of this research were taken seriously given the fact that the research largely involved villagers who may be less familiar with such research and its potential use. Ethics approval was sought (and granted) by the Lincoln University Human Ethics Committee.

Prior to interviews with the Government Fisheries Officers (Fisheries Officers and the Provincial representative), contacts were made through phone calls where permission was sought. During the phone conversation I briefly mentioned the purpose and aims of the study. At the village level, I worked through the village leaders. I contacted them and sought their consent to conduct research in the three case study villages. Before commencing each interview, an information sheet written in English (see Appendix 5), was given to the research participants. This was to ensure that the research participants understood the aims of the research and how the information was going to be collected and used. In addition, the information sheet also clearly stated the participant's rights during the interview and after the interview in terms of their participation during the interview and withdrawal during the interview or data withdrawal after the interview. A specified date for data withdrawal was

also stated in the information sheet. A consent form was also issued after this for the research participants to sign. The Consent form (see Appendix 4) certified that the research participants have agreed to participate in the research and whether he/she wanted the interview with them to be taped or not.

Confidentiality of the research participants was maintained through a number of ways. Firstly, transcription was done only by me and not by my research assistant and was stored securely by using a personal pass code to limit access to computer and electronically transcribed documents. Secondly, as noted earlier, pseudonyms were used to identify research participants. The listing of the actual names and the pseudonyms are kept in a locked filing cabinet in my office on campus to which only I have the key. Thirdly the tapes were erased as soon as the interviews had been transcribed.

As mentioned above, I hired a Research Assistant since it is often culturally inappropriate for a female to question males on her own. He has provided assistance and security during the field research. The Assistant was selected purposively, but impartially (i.e., no reason for him to get anything out of the research). The Research Assistant was a local and was selected on the basis of his level of education and experience in collecting research data. Prior to conducting the interviews, I advised him that information from interviews should be kept confidential and that he should not tell anyone about the information collected. The Research Assistant did not attend interviews with female research participants as his presence would have affected their responses.

5.13 Research constraints

The main constraints encountered during the research were associated with the practical methods. Since literacy level was very low in the villages, I had spent time at the beginning of the interview to explain the information sheet to participants whom I know cannot read. Moreover, for those that cannot write I audio recorded their consent instead of them signing the consent form. However, generally signing the consent form tends to raise curiosity and treated with suspicion. It is also an insult and embarrassing to ask people whether they could write or not.

During the initial interviews I noticed some male interviewees were timid and not as responsive as I expected possibly due to gender and cultural reasons. Therefore, I had the male Research Assistant conduct the interviews with male research participants. All of the research participants were fond of being taped, except for one who did not want to be interviewed. Since extra village research participants have been interviewed in response to the suggestions of the village leaders, additional resources (for example, money and time) were used. All data and information were subject to analysis and interpretation.

5.14 Chapter summary

This research took a qualitative research approach and the specific research paradigm used was the constructivist-interpretive paradigm. This combination of paradigm involves talking to people, getting their stories and interpreting their stories. Other theoretical frameworks or lenses which have been used to inform and strengthen the methodology and this thesis include the sustainable livelihoods framework, gender and development theories and Kaupapa Maori Research. A multiple case study (3) approach was used as a research strategy in this study. Prior to conducting the research the field research procedures were drawn up. A sampling strategy was also considered as the study involved sampling, specifically purposive sampling. Triangulation strategy was employed for validating the credibility of the data collected. Various methods of data collection, primarily interviews and participant observations and analysis were used to collect data. The research constraints and the ethical considerations have been presented.

As the following chapters demonstrate, the methodology has provided information enabling substantial contributions to knowledge and theory with regard to marine resource management and livelihoods in Temotu Province.

Chapter 6: Historical Perspectives on Livelihoods and Traditional Marine Resource Management under Customary Marine Tenure

6.1 Introduction

This chapter presents the historical context, as recalled by interviewees, of the three case study villages' livelihood systems, fishing activities, marine resources and traditional management under CMT. The next chapter presents the current village livelihoods and describes customary marine resource management changes that have taken place over recent decades. Chapter 8 contains the discussion on the phenomena under study. The livelihoods framework components are utilised to set out the context of past livelihood systems of the case study villages. These include livelihood assets, strategies, outcomes, institutions and processes, and vulnerability context. What, how and why fishing activities were traditionally carried out is followed by a description of marine resources in the three villages. The concepts of customary marine resource management under CMT, as locally practised, are also given. These include boundaries, rights, institutions and traditional management practices.

It is difficult to assign a single date to changes in cultures, traditions or aspects of livelihoods. However, here the term “past” is referred to, essentially, the pre-1980s. It was about 1980 that most changes started to occur in the three villages.

6.2 Livelihoods

This section presents the people's livelihood system as it was in the past, based on the information provided by the research participants. The Sustainable Livelihoods Framework was used as a guide to frame the interview questions.

6.2.1 Livelihood assets

When asked to identify the kinds of livelihood assets they have had and have depended on for livelihood purposes in the past, the research participants mentioned many livelihood assets. These assets are categorised and presented as natural, financial, cultural, social, physical and human.

Natural assets

All the research participants pointed out that land and sea resources were and are still the most “valuable resources” they own. AFY4 said, “*People depended very much on their natural resources that God endowed them with.*” AFO4 said, “*Land was and is still our mother and so it was a very important thing to us.*” AMO1 said, “*The Sea was just as important as our land.*”

The land and sea were very important to the villagers because they were their food sources. From the sea, many marine species were targeted for consumption. For example, AFO4 identified “*fish, shells*

and seaweeds” as the main fisheries species targeted in the past. According to AKIM1, some of the marine species targeted are no longer fished, and some that were not targeted in the past are now harvested. From the land, many traditional fruit trees with edible fruits were important to the villagers. Those mentioned include breadfruit, banana, coconut, tave, neyu, pawpaw, nuts, ingcori and coconut. Other plants were also useful for food, such as traditional cabbage (loprau, kilu, bono, derngi). Important root crops included kumara, pana, wild yam and taro.

As AFY4 said,

“In fact, all of their food came from the land and sea. Men hunted for wild pigs, birds, fowls and flying foxes for protein supply. Women used to pick varieties of traditional cabbage traditional cabbage namely; lopra, bono, loprau, kilu and derngi. They get root crops from the garden. The root crops include pana, yam (including wild yams), taro, banana and many other edible wild fruits, root crops, and plants.”

According to BMO1, food security means an abundance of land and sea resources.

Land and sea resources were not only a source of food, but also a source of income and wealth. People engaged in many different livelihood strategies in order to earn feather money and modern money (after its introduction during the colonial period). As BMO2, mentioned, “...*land and sea have almost all the resources people traditionally needed to earn money. For example, from the trees, some people from this village made outrigger. And from the sea, fishermen trap shark or did drop fishing to trade for red feather money.*” The introduction of agricultural cash crops, since the colonial periods within the cash economy, has transformed much coastal land into coconut plantations. Copra production became one of the main sources of income. CFO5 said, “...*land was and is still important for all agricultural activities which were and are still important for food and other cultural purposes. For instance, making gardens to plant yams and pana, breadfruit, tulip nuts, sago palm, etc. people needed land*”.

Land and sea areas were largely owned by tribes, not individually owned. Traditionally land was passed on and traced through the male’s tribe, since a patrilineal system is followed. All the resources contained in the tribally-owned land can be accessed by all the members of the tribe. Other traditional means where land can be passed on to another person outside the tribe or clan include marriage dowry (na ayelanga) and warfare settlement (na avonga nae popa). Land was part of the wealth that a tribe or clan could own in the past. Owning more land also guaranteed a sense of security for the tribes and individuals.

Financial assets

In the past, feather money (tervau) was the traditional form of money used in the Santa Cruz Islands. While most of the research participants claimed that feather money was the original money used in the Santa Cruz Islands, AMO2 mentioned that tervau made from shells was used before the feather money. In the past, feather money was a traditional financial asset. It was made from a unique bird feather glued onto a long special rope, coiled up and wrapped up with tapa cloth. It was stored above the fire place for safety purposes.

Traditionally, feather money played many important roles in the village economy as well as the lives of the people. It was a medium of exchange, though other valuable items could also be traded. According to AMO5 (informal conversation, June 2007),

“...tervau, was the common medium of exchange in the past, though, other valuable things such as pigs, food, mats and baskets could also be exchanged. Feather money was used to trade, pay for bride price, help other share love or niver, compensation in settling conflicts and war fares, nose and ear marking ceremonies, death related cultural activities, napa and nerver dance.”

There was no formal savings or investment; but rather these modern business phenomena also existed in the past. For example, Letaluas and Bonia (see Section 6.2.3) engage in many cultural activities to invest or save. These included bride price payment and ear and nose marking, traditional trade, custom dancing, initiating a male to go to the men’s lodge and to feed people. Letaluas saved for such cultural activities. For example, AMO4 said,

“...if a boy is my father’s name sake, I have to partake in his bride price. This is to safeguard my father’s name. Other relatives will give their contributions as well. The contributors will be given amounts to give. And if I was told to contribute the highest amount, when the couple got married and has a daughter as the first born, I will get the highest share of her bride price when she got married...So the money I used to pay for the bride price was my saving.”

In the past, accumulation of feather money meant status and wealth to the people. For example, accumulation of feather money was one of the qualities a Letalua would have to become a Bonia. More importantly, according to the people’s sharing culture, it was a natural way of traditional investment. They believe that when one loves and shares with others, he/she will receive more in return. It was a divine principle that they believed. However, this does not mean that they share because they wanted to earn money, but because love and sharing were part of their culture.

Traditionally, it is the men’s domain to earn feather money – by being involved in tradable productions. While trade is common between villages within the Santa Cruz Islands, in pre-history some traditional navigators from the Venga and the Neo villages also traded with the other groups

within the Province (for example, the Reef and Duff Islands groups). Very few women's productions were traditionally rewarded with feather money – for example, mat weaving and *“looking after dead body to have the flesh rot”* (BMO3). In addition, in the past, individuals did not copy another person's source of income. This was frequently stressed by most of the research participants in the three case study villages. AMY4 brought up the example that if someone's income source was producing lekona (tobacco), no one should try to copy it. The reason being the people's traditional income sources were associated with traditional beliefs and rituals. It was also due to the notion that having more people in one form of production would reduce the benefit accruing to all participants. Consequently, there was a *“traditional division of labour”* (as AMY2 preferred to describe it) and diversity in production.

The production of feather money was limited to certain people and inland villages, such as Jebuelo and Noipe of the Santa Cruz Islands. They possessed the feather money production skills, which were confidential and therefore highly specialised to only certain individuals, clans, tribes or village. Non-producers accessed the traditional feather money through trade with those inland villages. For example, the people of Venga village used to trade marine products with the people of Jebuelo village.

With the introduction of modern government during the colonial period and later the current national currency, modern money (notes and coins) was used nationwide, and has gradually replaced the traditional roles of feather money in the village economy. In the 1980's, the cultural significance of feather money within the transitioning economy diminished. For example, in some traditional transactions such as in bride price, feather money was no longer used. The people were gradually exposed to formal savings and investments, but these were uncommon for the villagers in the past. This change has also had significant implications for the access, use and management of natural resources as the need for modern money to sustain livelihoods started. This issue is discussed in Chapter 8.

Cultural assets

Culture is one of the most important assets that the villagers owned in the past. It is interwoven with every aspect of the people's livelihood system. AFOI (informal conversation, June 2007) summarised some of the things that were part of his village's culture:

“Our culture was always important to us and therefore we valued it. It was and is still part of our culture to weave mat and basket, hunt, make yam, taro and pana gardens, to fish, build houses with traditional materials (normally ground houses), buy pride price, arrange marriage, children to have their ear and nose marked with traditional earrings, initiate males to go and stay in men's lodge, customary child adoption, chew of betel nut, make pudding (traditional food make from cassava and coconut milk), custom dancing, live in extended families, customs, males to live in men's lodge, pray and make sacrifices to gods, customary land and marine

tenure, traditional governance, bake of food in earth ovens, cook cabbage with hot stones and many more... So these are all part of the way we lived in the past.”

There are cultural norms that govern how the people lived their lives in the past. Husbands were the head of the family, women and children were expected to follow what they said. Males were always dominant and they made the decisions. Women were not allowed to stay in the men’s lodge or walk past it. Families lived in extended families rather than nuclear families. Children could not say their parents’ names or disrespect them; they were to obey them at all times. Fathers and mothers could not talk with their sons-in-law. Sisters and brothers could not talk to their brothers-in-law face to face. Everybody was expected to respect one another and obey all their village’s traditional leaders. Each child had to have their ears and nose pierced. Also, *“teenager males used to live in madai and not with the rest of the family in the village, women were not allowed walk across the madai, gender roles, marrying outside of the family and many more”* (AMO1). All these cultural norms were interwoven with all the other aspects of the villager’s livelihoods in the past. They gave meaning and values to the villager’s culture.

In terms of village traditional production, the three case study villages were known for specific kinds of cultural products and activities. According to the respective villages’ key informants, each village was good at producing something. Venga village was known for outrigger production and fishing. Neo village was traditionally famous for shark trapping and shark trade. The northern part of Graciousa Bay was good in fishing, while the southern part were good in craft making such as lirpa nesa (traditional cloth made from banana fibre) weaving, banana fibre basket weaving and fishing net weaving. All these things were part of their heritage, custom and traditions.

However, many of the cultural activities and norms began to change due to both internal and external influences. Christianity, the modern system of government, modern education, and economic development, among others were frequently mentioned. As AFOI (informal conversation, June 2007) said, *“Unfortunately, our culture was and is still influenced by external factors such as the modern system of government, modern education, development, etc. This is not a very good if we want our culture to survive.”* Christian principles were embraced by the villagers, causing them to do away with their cultural traditions that were contradicting Christianity. In many ways *“...many aspects of their lives were changed from what they used to be prior to introduction of Christian faith”* (AMO1).

A modern fashion of clothing is another example of external forces that some older research participants mentioned. This is mediated through the process of modernisation. In Venga village, two older participants expressed that, in the past, women wearing trousers or tying their hair were seen as culturally inappropriate and were not entertained. This was not mentioned in the other two villages, Neo and Graciousa Bay.

Social assets

Social assets were also important in the livelihoods of the villagers in the case study villages. In the past, informal networks were present between individuals, immediate family members, extended family members, clans, tribes, customary friends (two or more individuals or families who became friends through some kind of cultural bilateral arrangements), village Letaluas, members of one village, and religious denomination. The relationships between these people and entities served as the catalyst to affect the informal networks and the trust that people had for each other. These trust-based relationships were very effective for providing mutual benefits to the parties involved. As AMO4 (informal conversation, June 2007) indicated,

“In the past people lived and related to their extended family... They helped each other in times of needs or trouble, sharing food, helping out in yam and pana clearing, mounting planting and harvesting and in many more areas of our lives...People lives were bonded together with “our true way” which was based on respect and love...Communal spirit and work was very good.”

The relationships could be ‘horizontal’ (between ordinary individuals) and could be ‘vertical’ (between ordinary individuals and village leaders). Love (niver), respect (ner amer luenger) and obedience (ner er lengtinger) were qualities that most of the older participants mentioned. AMO4 explained,

“Older people, including Letaluas and church keepers, were rendered the highest respect. In what ways do the people pay them respect? When they say something everybody follows it. For example, if the Letaluas place a taboo on a certain reef, the entire villager would obey. No one would break the taboo. Though penalty could be given to someone who disobeyed the taboo, at the first instance, every body opted to obey. In fact, obedience and respect level was “excellent” in the past...When the villagers were instructed by the church keepers to clean up around the village church on Saturdays, every villager would attend, except for those with genuine reasons.”

Physical assets

Physical assets included stone knives, axes and other basic garden tools, traditional fishing gear, traditional utensils, mats (nuni), needles to weave leaves to thatch house roofs, special bush rope (male or malip) used to weave sago palm leaves together onto strips of bamboo or betelnut to thatch roof and walls of house, houses (both home (mabeu) and men’s lodge (madai)), bows, arrows, spears, dancing ornaments, tumaric (ba), outrigger, tapa cloth (lerpa’au), cloth weaved from banana fibre (lerpa nesa) and feather money. These assets were used to undertake different livelihoods strategies (mentioned in Table 2), and therefore achieved different outcomes. Each of them had cultural value and purpose.

Some of the traditional physical assets owned by the villagers began to undergo changes. Examples of those that have been replaced and modified are given in Table 3.

Traditional	Modern
Stone knife	Knife
Stone axe	Axe
Plates (leaves)	Plates
Spoon (shell)	Spoons
Mats (pandanus, coconut)	Mats, mattresses
Tapa cloth	Clothes
Feather money	Notes and coins

Table 3: Examples of changed and modified physical assets

A number of external factors and processes have caused these changes. Most of the older participants from the three villages mentioned that, in the past, aspirations to own modern things was not very high and the rate at which villagers adopted modern things was also slow. However, some of the modern things were adapted for convenience and prestige purposes. Other changes were beyond their control (for example, the introduction use of modern money).

Human assets and traditional knowledge

For an individual, their labour and knowledge were important to sustaining livelihoods. For this reason, every member of the village is regarded as an asset to the village. Older people (40 years and above) and married couples were regarded as ‘very important’ because they were seen as role models of “our way of life” (num kirngu). They were leaders and possessed the traditional knowledge important to sustaining all areas of livelihoods. As AMO1 said, “the way we lived our lives in the past followed the way how our fathers taught us and this was important”, and AFO said, “we lived according to what our parents and leaders told us.” Such traditional knowledge was always passed on successfully to the following generations.

Moreover, in the past, there were people with different areas of traditional specialisation. For example, traditional doctors were important to ensure individuals, clan, tribe, families and even the entire village were that everyone in the entire village was protected. They healed the sick with supernatural power. This ensured protected, healthy and healed community members. Such knowledge was acquired through oral informal education (AFY4).

The fact that every individual was a human asset, having more children was important and necessary for future human labour in the family and the village. Also, having more children used to ensure continuity of the family in the events of epidemics and warfare. As AMO2 stated, “...children helped us in the garden and in the house to cook, look after the children, look for food, and many more. Also when their parents die they replaced them.” While a family could have more than ten children, the entire population of the village was small.

In the past, formal education was not common in the case study villages. This was due to two main reasons. First, there were few schools and these were far from most of the villages. For example, prior to the 1980's, there were very few schools in the Santa Cruz Islands. Though more schools were introduced in the 1980s, they were still far from the villages. For instance, in Neo, the school was located in the middle of the Termotu Neo Island (Figure 3). In Graciosa Bay, there was only one school located in the sub-village Naban (Figure 5). In Venga, the school was located in Lata. The students used to walk long distances to get to school everyday. Secondly, villagers perceive attending school as more fitting for males than for females. This is due to the cultural perspective that females are to stay at home. Therefore, in the past, the few villagers who attended schools were mainly males.

6.2.2 Institutions and processes

Prior to the current modern system of government, there was no formal system of government administering the village; rather, the village had its own political organisations. The village traditional leaders were referred to as Letalua and Bonia. Traditionally, every older man (including married males) was culturally regarded as a Letalua. A Bonia is a cultural title, which is higher than a Letalua. A Bonia earned his cultural title through hard work and the display of certain qualities, which include being wealthy (with the most beautiful dark-red feather money), knowledgeable in history and custom, good decision-maker, influential, well respected, brave, and a warrior. The Bonia status was gained through action and competition with other ambitious village Letaluas. Every traditional leader was a Letalua, but not necessarily a Bonia. The Letaluas and Bonias were highly respected by the entire village. Leadership was male-oriented; females were expected to submit to male leadership. A diagrammatic illustration of the village leadership hierarchical structure is given in Figure 11.

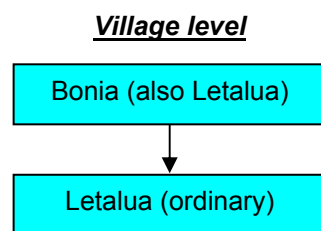


Figure 11: Traditional village level leadership structure

There could be several Letaluas in the case study villages, as there could be several in each sub-villages. Whilst these Letaluas are responsible for their own respective sub-village areas, they often communicate with other Letaluas in the village regarding the entire village matter, including resource management (AMY1, interview, 2007).

Apart from these traditional leaders, other leaders (whom I will refer to as 'modern leaders') became part of the village leadership. After the arrival of Christianity in the early 1900's (O'fferall 2006),

church elders – such as church keepers, catechists and priests – were also regarded as important leaders within the village (AMO1, interview, May 2007). After the country’s independence, the area council representatives and the ward members of the Ward from the case study villages also became part of the village leadership structure. The area council enforces and implements the requirements of the formal government at the village level. The church leaders and village area council representatives of the case study villages and the Ward members worked in harmony with the traditional leaders. Together they were responsible in all village decisions concerning the village affairs, including marine resource management. Figure 12 shows how the modern leadership structure fits into the traditional leadership structure, and this was largely in place before the 1980’s.

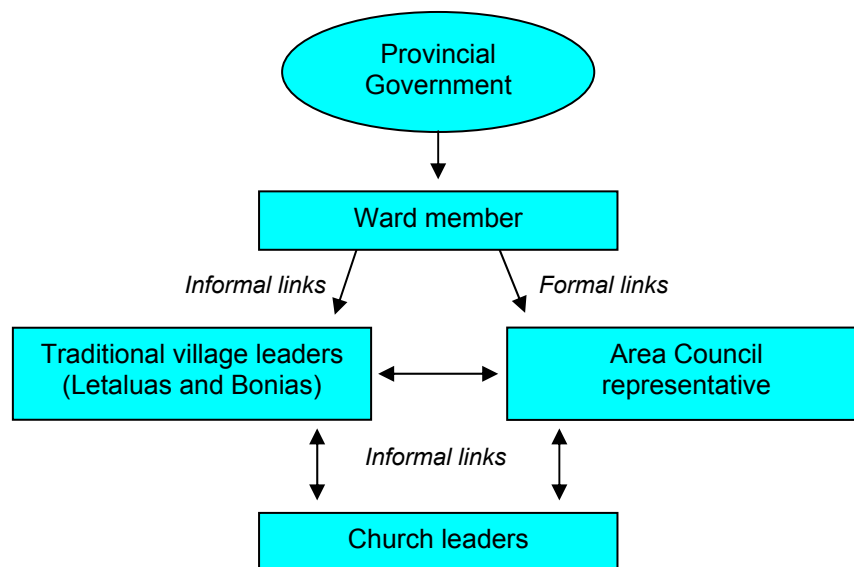


Figure 12: Modern village leadership structure – linkage to modern system of government

Other traditional processes also existed in the three case studies villages. These included customary marine tenure and land tenure, which is responsible for the land ownerships, access and management.

6.2.3 Livelihood strategies

In the past, people engaged in different livelihood strategies for different ends or livelihoods outcomes. The different livelihood strategies mentioned were given in Table 4. The livelihoods strategies each individual, family, or village engaged in was determined by various factors, which include the kinds of assets they were endowed with or owned and had access to, traditional knowledge they possessed, culture and gender. BMO3 explained, *“In the sea there are many marine resources which they got food and money from. And people did get these marines resources through fishing activities to provide food and make money. This was the same with land resources too.”*

Fishing	Gardening	Hunting	Carpentry, plus craft making	Agriculture	Cooking
1) shark trap	1) yam and pana	1) wild pigs	1) build homes	1) planting sago palm	1) pudding making
2) drop fishing	2) wild yam	2) birds	2) build outrigger	2) planting betelnut	2) baking in earth oven
3) kite fishing	3) taro	3) fowl	3) make paddle	3) nuts (niner)	3) roasting food over the fire
4) tou er merlir	4) swamp taro		4) make custom bowl	4) planting trees to make house, like nonimer, etc	4) cooking cabbage with hot stones
5) tou er malibir	5) lorua		5) make dancing ornaments	5) planting bread fruit	
6) turtle netting	6) banana		6) make fishing gear making tapa cloth (lirpe'eu)	6) planting trees of cultural importance	
7) ner er fishing	7) tobacco			7) planting of leaves important for cooking, feasting, etc	
8) collecting of trochus				8) Feeding pigs	
9) bernoku					
10) ber nalir					
11) buri with birlir					
12) lenialu					
13) collecting/digging shells					
14) collecting tekave					
15) fish poisoning					

(Source: Drawn by a research participant during informal conversations)

Table 4: Livelihood strategies generally practised in the past

6.2.4 Livelihood outcomes

Different livelihoods outcomes were expected from these diverse livelihoods strategies in which people engaged in. The following livelihood outcomes were mentioned by various research participants: food security (all research participants, interview, May-June 2007), income (all research participants, interview, May-June 2007), sustainable resource management (AMO1, 2 and 3, AFO1 and 3), protection, good health, respect, obedience, love, unity, peace and cultural survival.

6.2.5 Vulnerability context

External forces that did not conform to their culture or normal way of living were seen as threats. Modern education was one the factors mentioned by some older participants (three from Venga, one from Neo, and two from Graciosa Bay). For example, AMO1 mentioned that the secondary school children were exposed to and taught different things in their school contents. When they returned to the village from school during holidays, they introduced new things to the village. The villagers who did not attend school were therefore exposed to such ideas.

Natural disasters such as cyclones and earthquakes were regarded as threats to the village and their natural environment, but the older research participants reckoned that these were not frequent in the past. Some pests were regarded as threats to root and fruit trees, but they were not severe. These included certain types of beetles that ate root crops, and owls and flying foxes that feed on edible fruit trees.

6.3 Traditional fishing

This section presents the reasons why fisher folks in the case study villages engaged in fishing in the past, the marine resources commonly harvested, the traditional fishing gear and techniques used, and the importance of traditional fishing in the villages' livelihoods.

Motivations to fish

When asked why people fished in the past, different reasons were provided. These included food, preparation for any upcoming village cultural ceremonies, and trade. As AMO4 said, "*when we wanted to eat fish we went out fishing. Also when we know that there was going to be an up coming village occasion such as Christmas church festival or cultural ceremonies, we went out fishing too in preparation for it. And most fishermen fished because they wanted to trade their catch for money with other villages.*" When asked how traditional fishing had helped their wider community, AMO5 (2007) said, "*... when fishermen went out to fishing the catch was always shared to all village Letaluas in each madaï and the fishermen's entire extended family member.*" Most research participants claimed that this kind of sharing was always their way of life (num kerngu), in the past. As AFO3 (informal conversation, June 2007) said, "*...we shared with others and those we shared with also shared with us too*". People always fished to prepare for village occasions. Communal fishing often took place during these occasions, with the whole village involved.

Marine species traditionally harvested

Traditional fishing involved the harvest of both nearshore and offshore marine species for livelihood purposes. Wide ranges of nearshore marine species were caught (see Table 5).

Marine Species	Nearshore	Offshore
Shells	Coiya (V,N), Peli (V), Numbli (V,N), Benia (V), lau, Nibulala (V), Nesau (V), Ler (V), Dambu (V), Erda (V), Nibupir (V), Besingake, Hawaiian shells (N)	n/a
Fish	Erpe (V,N,G), Bu (V,N), Jo'ober (V), Nerer (V,N), Terblaile (V,N,G), Blapu (V,N,G), Birlu (V), Na e'er (V,G,N), Dirlve (V), Lve'e (V), Nugir (V,N), Terklava, Tamo (V,N), Mo (V,N), Bealir (V), Nereliu (V), Bopri (V), Blesikir (V,N,G), Nodirla (V,N,G)	Shark (V,N), Snapper (V,N,G), Barracuda, Other offshore fish types
Coral	lu oterpia (V), Lirda (V), Nano'o	n/a
Sea Slugs/Cucumbers	Tekave (V), Wangi (V,N), Be (different species) (V,N,G)	n/a
Seaweeds	Lolir (V), nimu erli (V,N)	n/a
Crabs	Lenga (V,N), Lo yam (V,N), Webu (V,N), Lodei (V,N)	n/a

(Source: Interviews, May-June 2007)

Table 5: Traditionally (before and during 1980s) harvested nearshore and offshore marine species

Traditional fishing techniques

Many types of traditional fishing techniques were used to harvest the nearshore and offshore marine resources (see Table 5), as AMO1 commented, "...nearshore fishing techniques are different from those done offshore". In terms of male traditional nearshore fishing techniques, some techniques were more common because the knowledge and skills required to carry them out were widely known (to every man +boys) and therefore could be done by any man (Table 6). Other traditional male fishing techniques were strictly specialised (Table 6). This meant that only certain people engaged in them, because the skills involved were confidential and confined to the practitioners. There were also spiritual and ritual limitations to using such fishing techniques. As AMOI said, "those kinds of fishing techniques were done only by those who knew them and those who have 'drunk the custom medicine for them' because they could kill."

Fishing techniques	Venga		Neo		Graciousa Bay	
	M	F	M	F	M	F
1) Kite fishing	x		x		x	
2) Tou er merlir	x				x	
3) Tou er malibir	x				x	
4) Turtle netting	x					
5) Ner tulegirnga	x		x		x	
6) Ner er fishing	x		x		x	
7) Collecting of trochus	x	x	x	x	x	x
8) Bernoku	x	x	x			
9) Ber nalir	x	x	x	x	x	
10) Buri with birlirlir	x		x			
11) Lenialu	x					
12) Collecting/digging shells		x		x		x
13) Collecting tekave		x		x		x
14) Collecting sea slugs		x		x		x
15) Collection of seaweeds		x				
16) Fish poisoning		x	x	x	x	x
17) Bamboo fishing		x	x	x		x
18) Lighting of fish in the night		x		x		x
1) Shark trapping		x		x		
2) Drop fishing		x		x		x

Table 6: Nearshore and offshore fishing techniques – specialised or not specialised, used by male (M) or female (F)

On the other hand, traditional female fishing techniques were common to all women, and they were distinct from traditional male fishing techniques. When asked about what fishing techniques women traditionally engaged in, three female research participants responded:

“We only feed fish with a certain leaf which kills them... and we collected shells during low tide.” (BFY1)

“Before we collected shells along the reef during low tide.... We also get the poison leaf to poison the fish during low tides.” (AFO2)

“During low tide we take the poison to the reef. We get seaweeds too, called lolir.” (AFY1).

Women only fished during low tides and engaged in limited fishing techniques, using gears that were very basic and different from the fishermen. Therefore, in the past, men and women engaged only in their respective traditional fishing techniques.

Nearshore fishing techniques were also communal in nature. This means that they were usually done collectively by members of the family or the village. For example, reef gleaning was done by women and children, and lenialu and buri were normally done collectively by village men. In lenialu and buri fishing, women and children often assist in carrying the fish back to the village. The communal nature of nearshore traditional fishing was very strong in the past.

All the offshore fishing techniques were strictly specialised; therefore only certain people engaged in them. These fishermen also engaged in nearshore fishing. AMO1 mentioned, “...*those who fish offshore, fish offshore...during stormy weather they fish on the nearshore reef too*”. All specialised techniques were largely done for income purposes or trade, though sometimes some catch were eaten and used for cultural purposes.

The kinds of traditional fishing techniques used in the past are used during certain times only. This is consistent with the tradition that fishing was done only during certain times. The appropriate times for fishing were determined by the annual seasonal and tidal cycles. The relationship between these cycles and traditional fishing and management practices are detailed in Section 6.5. All the older research participants mentioned that, in terms of specialised fishing, the fishermen’s gods often determined when they should go out fishing. Women were strictly allowed to fish only during low tide, though men could fish during all tides. Different marine resources were targeted during specific times of the year (and even month); therefore, their harvests were not regular. Certain flowering plants were used as an indicator to tell when these specific marine species were ready for harvest.

Traditional fishing gear

According to all research participants in the three case study villages, prior to any outside contact, all the fishing gear used was traditional. Those mentioned by the research participants include strings, hook, spear, bow, net, fish trap, coconut shells, outrigger, paddle, lapnge, floater, rope, mask, and bait. Strings (nui’i) were made from bush rope or young coconut fibre twisted together. Hooks were made from wood (nouno) shaped like hooks but without curved ends (bualver ngade). Spider web (blir bia) was also used as hooks. Spears were made from sharpened special wood tied onto a dried cane (neni). Bows were made from stick and twisted tepasoli. Nets were made from coconut palms and woven tepasoli. There are three types of nets: lenialu, birlir and bernalir. Fish trap, called bernoku, were made from loya cane rope and its thorns woven together. Outriggers were made from wood (nobu), as well as paddle and lapnge. Floaters (tou) were made from a special tree called nobo, which floats when dried. Ropes used in fishing were made from twisted tree barks. Coconut palms or woven pandanas

were used as masks. Baits used were cooked food (such as bread fruit), ripe fruits (such as pawpaw), smashed crabs, hermit crabs, shells, chicken feathers, or anything that attracted fish to the hook. It should be noted that the traditional fishing gear used by male and female were also different in many ways. For example, women did not use strings and outriggers (AFO1, CMO2).

According to many research participants, there were changes in the kinds of fishing gear used by the villagers; but the changes were not substantial prior to the 1980's. Just to mention two examples, BMO1 said, *“all the things we used in fishing in the past were made from bush materials, and so they were traditional”* but not *“until the end of WWII...and the coming of missionaries, modern government and inter-marriages between islands some villagers started to acquire some basic introduced fishing gear such as hooks and strings.”* AMO2 and AMY3 said, *“...until the end of the 1980's, things were very much like before.”*

Each village and individuals specialised in fishing gear production, which was often for specialised techniques. For example, Venga, Neo and other villages around Nendo produced outriggers. People from Graciosa Bay often bought outriggers from these villages. In Graciosa Bay, some of the southern sub-villages traditionally produced fine fishing nets. They sold these to fishermen in other sub-villages in Graciosa Bay and to fisher folks in Venga and Neo. The outriggers and the fine nets, among others, were regarded as important sources of income, and entry to their production was strictly limited by entry protocols and rituals. These protocols and rituals were normally sanctioned by the individuals and families already engaged in their production. Other specialised gear included weaving of traditional nets, twisting of drop fishing lines, and the production of hooks.

The traditional knowledge about the production of specialised traditional fishing gear was handed down through generations by oral histories. Such knowledge was sacred and confidential. The fishing gear production specialists rarely engaged in specialised fishing techniques, but were often involved in nearshore communal fishing activities. According to most research participants, this was due to the common knowledge that if they had ventured into other specialised traditional fishing activities to generate income, that would have limited the benefits accrued to those already engaged in it. As AFO2 explained,

“In the past, Letaluas have (naelue) their own income source. Whoever that engaged in shark trap fishing did that only, whoever, engage in drop fishing, he did that only, and so on. This applied to all the fishing activities that were traditionally used to generated income. The reason for this was that if there were many people engaged in a particular income sources then the people are not better off. They will each get little. So whoever engaged in drop fishing did drop fishing only and whoever traps shark, traps shark to earn feather money.”

On the other hand, the production of unspecialised traditional fishing gear, such as production of poison to kill fish, was not specialised. This meant that any person could be involved in their production and usage.

6.4 The status of coastal marine resources in the past

As indicated in the sections above, all the research participants considered that marine resources were plentiful in the past (Table 7).

	Nearshore	Offshore
Fish	<ul style="list-style-type: none"> • Did not have to go further out into the reef to fish • One can catch more within small area • Could catch plenty big fish on the shore • It took less time to have your canoe filled with fish • They were always in schools on the shore • One could see fish fin everywhere from the shore 	<ul style="list-style-type: none"> • Took shorter less number of hours to fill the outrigger • Did not cover big area to fish
Shells	<ul style="list-style-type: none"> • Did not have to look for them, they were just everywhere on the shore • One women could fill her basket within small reef area • Most shells were collected on the shore. They stayed under the rock and holes in the rock 	
Seaweeds	<ul style="list-style-type: none"> • There were plenty of them near and on the shore 	
Corals	<ul style="list-style-type: none"> • They were plenty • They were just near the shore • They grow very tall 	

Table 7: Descriptions of the abundance of marine resources in the past (nearshore and offshore)

Traditionally, marine resources were managed under CMT supplemented by the management practices embedded in the people's traditional beliefs. According to all the research participants, the traditional management system was effective, based on their perception that marine resources were plentiful in the past.

6.5 The customary marine tenure

6.5.1 Introduction

According to all the research participants, customary management under CMT arrangements used to be effective in managing coastal marine resources. The following sub-sections discuss who was responsible for the management under CMT, and the boundaries and rights in relation to CMT.

6.5.2 Who was responsible for marine resource management under CMT?

Traditionally, Letaluas were powerful in terms of traditional marine resource management. They managed the marine areas and resources within their respective village reef boundaries. The land areas

adjacent to the village reef were owned by various land owners (tribes), but the management of the reef was always in the hands of the Letaluas. For example, in Venga, when asked the question “who managed the reef adjacent to the land you owned along the seashore?” AMO1 replied, *“That land area was mine but the reef was controlled by the Letaluas’ laws. We all fished together there but as I have said fishing in that reef were always under the entire village Letaluas’ hands.”* AMY1 replied, *“The Letalua always communicate between each other regarding village matters.”* This also applied to Neo village, but it was less clear in Graciosa Bay, given the spread and distance between the sub-villages in the past.

Some sub-villages of Graciosa Bay also ‘owned’ land and fishing ground between Baenga in Venga and Nemba village, called Graciosa Bay Baenga (Baenga nia lir Nabakaenga). The management of the marine resources in the reef was in the hands of the village Letaluas, where the owners come from. CFM2 said, *“I used to go and fish at Baenga nia lir Nabakaenga. There were three different reefs belonging to three villages here in Graciosa Bay, Manau, Banua and Ne’erle. Letalua from these villages look after those reef resources.”*

6.5.3 Ownership to nearshore and offshore reefs

Nearshore reef

In the case study villages, tribes or clans who owned land adjacent to a reef also owned the reef that stretched out from their land, and therefore were considered to have the primary marine rights to that reef. These tribes traditionally lived together in one village or sub-village. While the tribes and clans collectively owned the reef within their boundary (detailed below), the reef management was largely handled by the village Letalua, as mentioned above. The owners had the primary marine rights through birth over the land and the reef, but all the villagers were allowed to fish in the reef area. For example, CBO3 said, *“...the land was mine as well as the adjacent reef. I and the Letaluas here looked after it.”* AMY1 expressed, *“.....In the past, the reef belongs to all the villagers but the land adjacent to the reef is yours because that’s your land and beach area. Therefore in the reef everybody in the village can fish there.”*

Some villagers had secondary rights to the reef based on marriage and residence. When a village woman married a man from another village, her husband and any children from the marriage would have secondary rights. When a woman from another village married a village man, she, (but not her children) had secondary rights. As AFO3 explained,

“...if a female got married to another man from another village, her children and husband has got secondary right to access and use the reef. When they wanted to fish here, their uncles of cousins normally accompanied them. Likewise, if a woman got married here, she has got secondary right to the reef” and AMY1 said, *“when it comes to relationship between extended family members, a member who have left for another or sub-village area, due to marriage,*

fishermen of that extended family can always invite their family members to fish with them when involved in communal or group fishing methods such as buri or lenialu.”

Sometimes, secondary marine rights were also given to ones who lived in the village and therefore allowed to fish in the reef. This was often done through invitation from the primary right owner. As AMF1 said, *“Whoever lived in this village but originally not from here can also fish in our village reef. Also villagers from the other sub-villages could also fish here when we invited them. We often seek permission from the sub-village traditional leaders. We always accompany them.”* This scenario was more evident in Venga and Neo village. For example in Venga, the reef on the eastern end of the village was strictly for the people from Manobu and Noiya to fish in. Likewise, the reef on the western end was only for the Malnabe and Biakio people. The people from Manobu and Noiya could fish anywhere within their reef (eastern end of the village) and the same applied to Malnabe and Biakio people and their reef. In Graciosa Bay, this was not common due to the spread of its sub-villages.

In the past, one did not necessarily need to be the owner of the adjacent land to fish in a particular reef within their sub-village. As AFO3 said, *“...we fished anywhere we want to but we did not fish in the other end of the village because it was theirs.”*

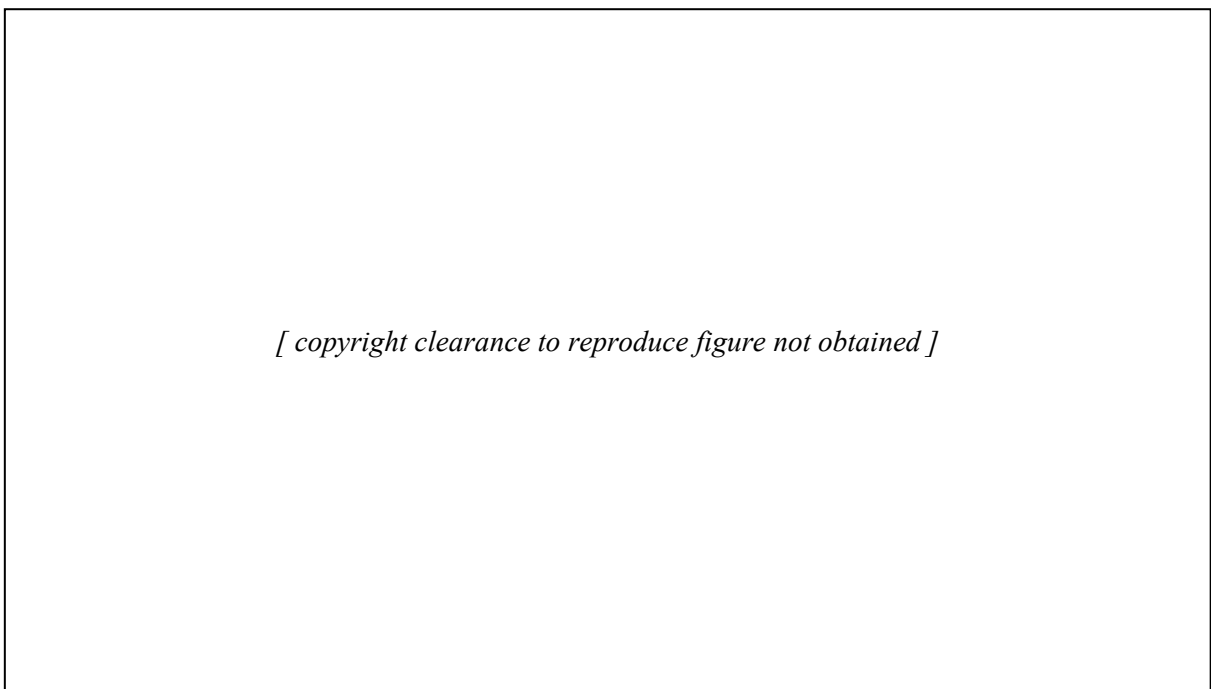
Despite these restrictions, there was a special case with buri fishing. This fishing technique involved building stones. Taboo, physically signified by a stick at the location, was then placed around the vicinity of the built stone wall. No one was allowed to fish there during the taboo period. This was to attract more fish and therefore ensured a successful harvest. When the buri was ready, the stones were removed and a net was put around it to capture the fish. The buri belongs to those villagers who built it and therefore cannot be stolen by others. Villagers observed these rules. With this fishing technique, the buri owners usually invite their friends or kins from other sub-village areas to fish with them. It was part of a social activity, a way of creating, maintaining and strengthening relationships, creating new relationships, and reaffirming support for one another. Permission was often given by the sub-village Letalua. In most cases, they were granted permission. For example, AMO1 said, *“When people from this end want to fish their buri they often invited their friends from the other end of the village. Their friends will do the same for them too in the future,”* and AMY1 said, *“...people from Nelukir can invite people from Noiya to fish at their buri and vice versa.”*

Apart from the primary and secondary right holders, outsiders were not allowed to fish in the reef. Some research participants (five from Venga, four from Graciosa Bay, and two from Neo) mentioned that because outsiders were excluded, more marine resources were available for inclusive users (primary and secondary rights holders) to exploit for livelihoods purposes in the past.

Offshore reefs

The three case study villages each have one offshore reef (Figure 13), which was fished by all the fishermen in the village involved in drop fishing and shark trapping. Some participants (two each from Venga and Neo, one from Graciosa Bay) spoke of folklore that asserted that their ancestors were the original users of the offshore fishing ground they have and still fish. As such, they owned it. AMO1 explained that no one from another village was allowed to fish in another village's offshore fishing ground. Trespassers were often fined, or killed in some instances. Killing was later eased by Christianity, as well as the modern form of government laws, according to most of the research participants.

6.5.4 Reef boundaries and marine resource management in the case study villages



(Keys: Circle = offshore reef boundary; Lines = nearshore reef boundary)

(Source: Wikipedia, 2007)

Figure 13: Nearshore and offshore marine boundaries of the three case study villages

Nearshore boundaries

In the past, reef boundaries were very important because they determined the boundaries of ownership, and therefore the Letalua's sphere of management influence. Various landmarks were mentioned as boundary indicators in the case study villages. The landmarks include beaches, passages, big rocks and big trees on the seashore. There were two distinct categories of reef boundaries that were applicable to these villages. The first category was reef boundaries within the villages. This refers to the boundaries between the sub-village areas within the case study villages, marked by one of the landmarks mentioned above.

The second category was boundaries between villages. This refers to the boundaries between the case study villages and their neighbouring villages or land holdings. This kind of boundary was very strict in the past in the three villages. Trespassing into another village's marine areas traditionally warranted serious penalties, which include fines, battle and, in some case, the trespasser was instantly killed.

These two categories are important in explaining the factors that have eroded CMT and contributed to the decrease of coastal marine resources in the later decades till now.

Through the process of colonisation, some of the customary marine areas in the three case study villages were acquired for economic development and resettlement. This was further amplified by the modern system of Government during the post-independence period. For example, in Venga village, the eastern part of Nela's (sub-village) marine areas was acquired by the Provincial Government for economic development purposes. In Graciosa Bay, the northern part of the Nemu (sub-village) marine area was acquired by the Government to build the Lata port. In Neo, some parts of their eastern coast were bought by the Government to resettle the inhabitants of Tenakula Island after eruptions in the 1950's.

Offshore boundaries

The distance of the reef boundaries from shore to ocean normally depends on how far one could see from the seashore. The villagers, however, have connections with their marine environment, which extend beyond how far one can see from the shore. Offshore reefs are hard to mark physically, so fishermen traditionally used landmarks such as mountain tops to mark their fishing ground. The landmark was called 'La'ake'. The fishermen always made sure that their outrigger was aligned with the landmarks. During fishing, when the fishermen identified the landmarks, they would know that they were within their rightful offshore fishing ground. The landmarks were important because they helped the fishermen not to drift away.

6.6 Traditional marine resource management practices

In the case study villages, there were various traditional marine resource management practices. This section presents the role of traditional beliefs in traditional marine resource management, followed by the various traditional marine resource management practices mentioned by the research participants.

6.6.1 Traditional beliefs

Apart from the CMT arrangements, in the past, some traditional practices rooted in the villagers' culture and traditional beliefs contributed to the management of marine resources in the case study villages. Therefore, the manner in which marine resource management was arranged and carried out was indistinguishable from the people's culture and indigenous beliefs, as well as the nature of the village social structure.

Protocols were encoded and enshrined in their oral traditions and were often derived from their deity and sanctioned by their ancestors as *'the way'*. *'The way'* was orally handed down through the generations as a holistic approach to village life. One example of the traditional beliefs, practices and protocols was that women were strictly forbidden to cross the reef with their bodies in the water, because it was believed that this would cause the decrease and extinction of marine resources such as clam shells. AMO1 recalled, *"This is what our ancestors told us: They said if a woman 'crossed the reef' (kawile mapa) then shells and fish will be lost or decreased in number."* Women used to go out fishing during low tides only. Moreover, prior to the arrival of Christianity, it was believed that *"all things have a spirit"* (AMO1), and that all events and activities inherently have connections to these spirits. Consequently, many aspects of traditional fishing were specialised.

Most fishing practices that stemmed from these underlying beliefs were highly ritualised and were undertaken by specialists who received such knowledge from their elders. Most involved use sacred bush leaves and other rituals. Through this, the power of the ancestral spirit was evoked for different purposes in fishing (for example, protection during fishing or a good catch). Consequently, in the three case study villages, the implication of traditional beliefs on customary marine resource management was quite obvious, specifically in terms of the relationship between traditional beliefs and fishing activities and marine resource management.

6.6.2 Fishing gear and techniques – environmental soundness, limited accessibility and entry into fishing

All of the research participants argued that the traditional fishing gear and techniques also had implications for traditional fishing gear in the past.

Nature

All the research participants mentioned that traditional fishing gear and techniques served as a management measure because they were environmentally friendly, having little or no impacts on the marine environment. For example, some said,

"...in the past when we used lenialu fishing we caught many fish and also the fish that escaped the net were not hurt. Unlike now with the modern fishing nets, escaped fish will be hurt and later die. At the same time the modern fishing net unselective." (AMO3)

"When we were small there was no string so we used bush ropes...there was no net they used coconut prone and nets made from bush ropes." (CFO1)

"Those types of fishing gear people did in the past did not have any impact in the sea."(AFM2).

"With these traditional fishing techniques fish were not afraid...for example, in the past they do buri fishing. And with buri one person will jump down here, one there, and there, and then they

will splash around the buri. All the fish around the buri will swim towards the buri with not difficulty for the fishermen. But if one would to do this today, he will not catch any fish because the fish have got scared by the modern fishing net and other modern fishing techniques.”
(AMO2)

Limited accessibility and entry

Some research participants (for example, AMY2) argued that production of most fishing gear and techniques were specialised meant that there were limited access to fishing gear and entry to fishing (especially specialised ones).

Similarly, fishing knowledge and skills were traditionally confidential, and only those fishermen who had practised them could effectively enter the fishery, especially specialised fisheries. In addition, the notion that not all fishermen engaged in specialised fishing techniques, to avoid limited benefits accruing to participants, kept others from entering fisheries to generate income. As AMY2 said,

“Therefore management in the past is driven by what they say “only certain people have access to this activity”. Not because it is restricted but because of the confidentiality in the skill that they have. They do not publicly mention it because that’s where the secret of them earning money is... They perhaps may not realise it as being a management measure but it could be part of it. That is only certain people have the skill to do engage in such activity, that is, fishing. Not all old people engaged in fishing. Only the people at Noiya (sub-village) engaged in fishing mostly. Therefore in management it happens this way, only certain people have the skill to fish and it is something that has been passed on to those who have the skill by their father or clan member.”

The common or unspecialised traditional fishing techniques were carried out by all fishermen. However, they were done only during certain times. Moreover, the traditional fishing gear and techniques used in the past were very specific to certain marine species. Consequently, this reveals that fishing in the past targeted particular fisheries. As represented by AMY2, this is remembered as a sustainability measure: *“Those types of fishing people did in the past did not have any impact on the sea because they were being selective in their fishing... They also harvest certain marine species during certain times of the year only.”*

6.6.3 Gender and fishing

In the past, there was a clear line between which fishing techniques women (including female children) engaged in and which they did not. Some research participants have argued that gender and fishing in the past have also had management implications because women engaged only in reef gleaning activities and targeted fisheries. Moreover, they fished only during low tide and engaged only in very basic fishing techniques such as fish poisoning and collection of shells and seaweeds. More

importantly not all women engaged in fishing, as culturally they were to look after the household and ensure a daily food supply for their family. Hence, the impact their fishing activity had on the nearshore marine resources was considered less than men's. AMO1 said, *"...in the past marine resource were plenty because when men went out fishing offshore, nearshore resources were often left untouched..."*

6.6.4 Traditional environmental knowledge

Traditional knowledge was also a very important component of the customary marine resources management regime in the past. For example, as the following respondents indicate, conserving the trees on the seashore was essentially important (according to most of the research participants) to provide shade and breeding grounds for marine life on the reef.

"This is how my fathers told me and we did it in the past. They said any tree standing near or over the sea must not be cut down. This was because all the fish lived and breed up trees shade on the shore... This is how we look after fish before. Also the shells lived and breed under the shade of three shore trees before they went out further in the deeper water on the reef. They did not come in from the sea but they went out to the sea when they were big..." (AMO1)

"This was what I hear from our fathers, they said things like trochus, and other sea shells reproduced on the shore under the shade of trees that grew over the sea shore. For this reason people did not cut them down or spoilt them in any way." (AMY1)

This is reflected and integrated with their traditional ecological knowledge of these species life cycles and habitat requirements. Conserving the trees on the shore had caused fish to reproduce in an undisturbed environment and therefore become more plentiful. It appears that they often stayed around on the seashore in schools. According to AFO2, *"I mean fish and shells were plentiful on the shore area and they were easy to catch and one did not have to go far to catch and collect them."*

6.6.5 Seasonal closures

The field results also revealed that seasonal fishery closure was a traditional management measure. This was described mostly by the older research participants:

"...in terms of fishing, they only fish during certain times and targeted certain marine species at a particular time..." (AFO3)

"People in the past looked after their marine resources very well. For example, with trochus they collected it during certain times only and not every time. Also in terms of fishing they only fish during certain times too. The "right time" for collection and fishing was when the specific targeted marine species was due for harvesting or collection." (AFO2)

When asked why fisher folks in the past only go out fishing at certain times and targeting specific marine species, 12 of the 14 responses related to two main factors: their annual seasonal calendar and tidal cycles. In particular, how the cycles related to the targeted marine species spawning, migration and aggregation periods. As such, research participants stressed that fisher folks in the past were able to tell when was the right time for them to fish for the targeted marine species. How the seasonal and tidal cycles relate to traditional fishing was described by two (of the 12) research participants in the following ways:

In terms of the annual seasonal calendar, AFO4 (informal conversation, May 2007) described,

“Making yam and pana gardens is very important for us. Men or the husbands are often involved in cutting down the big trees and branches. They basically do the big jobs involved in the process of yam and pana garden. The yam and pana garden took place during the summer months (August to October) and extending to November and December. Nearshore fishing was less common during this season because there is a considerable amount of labour involved in the garden making. In addition, the tides of this season are also less suitable for reef-gleaning activities and also it is also thought that this is the season when many nearshore reef species are at their spawning peaks. Therefore, during this season, fishermen often fish offshore. Only certain types of marine species on the nearshore reefs were targeted during this period.

The stormy period of the year often starts as early as December through February and March. Consequently during this period most fishing activities were done on the nearshore reefs, due to safety reasons. From March to June, sometimes extending to July, this was yam and pana harvest period and normally, there was not much work required in the garden except for yam and pana harvesting and storage. This was a women’s task including the children. Anyway, yams and pana were stored in garden huts in preparation for the next planting season. Because there was less garden work required during the harvest period, women and children’s, involvement in reef gleaning was highest. Also because the harvest period coincides with season when there are always extreme low tides more women and children were involved in reef fishing activities. They engaged in shell collection, seaweed collection, fish poisoning, etc. On the other hand, most fishing techniques by men were done offshore as the weather was suitable for them to do so. However, communal fishing techniques by men were common during the extreme low tide season too. However, certain fisheries are targeted and not all, for example the flying fish is often targeted during this period. After these harvesting months, the process started all over again for us.”

AMO1 further explained this in relation to their annual weather patterns:

“In the past, in terms of fishing, this was (and still) actually the time (May to July) to fish at the offshore reef where these fishermen now normally go to. During times of cyclone they fish on

the near reefs and this how they also look after the reef...They alternatively fish on the near reef during cyclone times and fish in the offshore reef during fine times.”

According to these research participants (12 of the 14), annual seasonal calendar and weather patterns are important because their occurrence determines the locality and times of fishing and the degrees of women's involvement. During good weather, most fishermen fish offshore, while nearshore fish would recover. However, AMO1 further explained that:

“...some nearshore marine species were harvested during this times, only if, they ready to be harvested. The specialists always indicate the right time for harvest of specific marine species. They used the tidal cycle, the lunar cycle and special flowering plants, like malir, to tell when the exact time to fish for the marine species was. Moreover, since this “good times” always coincides with extreme tides, in most cases, during that period, women and children's fishing activities were common.”

Selection of the tide to go out fishing was also another important management strategy. As part of their traditional environmental knowledge, two research participants explained that the tidal cycle follows the lunar cycle, which also coincides with the annual agricultural calendar mentioned above. As AMO2 explained:

“...we have very low tides during May through to August. So, reefs are optimally exposed for gleaning during daylight hours around new moon and full moon. During this time, more women engage reef gleaning as well as communal (basically men) fish harvesting methods such as lenialu, buri, birnalir, etc are at peak. Moreover, from September through to February, very low tides occur at midnight and this happens again during full moon and new moon periods. However, these tides rarely get as low as those occur between May and August.”

Traditionally, while women strictly fished during low tides, men could fish during both low and high tides. This was a point frequently mentioned by the research participants. For example, AMO2 said, “Before they (men) are very selective of which tide to go out fishing.” When asked why they were being selective of which tide to fish, these were the reasons given:

“The “right time” for collection and fishing is when ... the tide for harvest is right to ensure accessibility.” (AFO2)

“...In the past people are selective and know what types of tides (mapa) that they should fish. These refer to things like shells, different types of fish etc. All these have their specific tide to fish for them. The old people know this very well. For example, the tide (mapa) they call “mapa nia lir mabe”(an average tide), the old people don't fish during this tide...They (ancestors) said during these times of this type of tide, they (most marine species) might be reproducing and they must be left alone. No one supposed to collect them or fish for them. The reason for doing this

was that when it comes to the right tide (mapa) for those marine species to be harvested, there should be plenty of them available for harvest.” (AMY1)

While most research participants shared the knowledge that the choice of tide to fish was traditionally determined by the annual seasonal calendar and the tidal cycles, two participants interestingly mentioned that “*when and when not to fish*” also depended on the fishermen’s’ fishing gods. As AMY2 said, “*...their fishing gods could also tell them when to fish and when not to fish.*”

According to all the research participants, in the past, fisher folk only fished when it was appropriate for them to fish, as it was always regarded as “*the way it should be*”. Such knowledge has been passed down from generation to generation and was therefore common to all members of the village. As AMO1 said, “*This was what my fathers taught me...*”

6.6.6 Taboos

When asked about the management measures used in the past, ‘taboo’ was frequently mentioned by all the research participants. Twelve of the 14 shared the view that taboo was practised in the past. For example, the common response from them was, “*... in the past people do place taboo on their reef.*” Three different reasons were mentioned as to why they normally place taboo on their reef.

Firstly, to maintain the abundance of their marine resources, they respond quickly to any obvious indicators, and place a taboo on the reef. For example AFO1 said, “*...so that the reef is not fished always. For example, when they see that there were not plenty fish on the reef or if they don’t see school of fish-by not seeing fish fins showing up, they then place taboo on the reef.*” Secondly, villagers wanted to ensure the resources they depended on for livelihood purposes were not at stake. As AFO2 said, “*...they taboo the reef with the intention to have the marine resources increase again.*” Thirdly was to ensure a successful communal harvest of fish prior to village events: “*But also if they know that something is going to happen in the village they taboo the reef too. As they approach the event or occasion then they open the reef again so that people can fish and prepare for that event, for example, Easter, Christmas, etc.*” (AMO3)

Apart from the three reasons above, I also observed (May 2007) that if there is a death in the village, no one was allowed to go out fishing. That was traditionally regarded as a sign of respect showing that everybody shared the deceased family’s sympathy.

However, three participants argued that taboo was not practised often in the past, due to there being plentiful supplies of marine resources and therefore taboo was not necessary. In their view, taboo was normally done only prior to any upcoming village events, such as church festivals like Christmas or Saints.

For example, AMO3 mentioned, “...they did not taboo the reef before because there was no shortage of marine resources on the reef. They did not taboo the reef, but for example if it’s a saint’s day or Easter, specific fishing grounds will be closed”, and AMO1 said, “In the past we do not taboo reef rather this is the way it was for us” And AFO5 said, “No they did not taboo the bech-de-mer and similar fishery in the past because it was just all over the reef (niber no vo).” To support this point, AMO1 mentioned, “I was already a boy and could remember things.”

Responsibility about taboo was largely in the hands of the village Letalua, as AFO1 said, “The decision was made by the Letalua. One often came up with the idea of taboo and then it was talked over by all the letalua and the decision was effected.” Once the decision was made, “they told the decision to the people during village meetings as well as after Sunday services” (AFO2). During the taboo “no one was allowed to fish” (AFO2) in the tabooed reef. The closure and opening of the reef was always marked with a ritual: “...they always make a feast to mark the closure and reopening of their reef” (AFO2). According to AFO4 (informal conversation, May 2007), “The closure feast served as a public notice about the closure to the villagers and that they have to abide to the taboo. And the reopening feast served as a public notice that the tabooed reef was now open for fishing.”

In both cases, the two feasts reinforced the importance of the taboo to the villagers. This was implied in the following way: “Whoever goes out fishing in the tabooed reef during the time they had the taboo would be fined because they always make a feast to mark the closure and reopening of their reef.” (AFO2)

According to all the research participants, the peoples’ compliance level with taboos in the past was very good. For example, AFO2 said, “...the compliance level was very good. No one goes out fishing then”. When asked the question, “Why do you think the compliance level was very good in those days?” AMO1 mentioned, “...villagers lived according to what the kastom said and therefore always obey what the letalua told them,” and AMY1 said, “...before it was very good because when village letaluas said something everybody obeyed it.” Thus implied that custom, respect and obedience played a significant role in the way people observed taboo in the past.

6.7 Chapter summary

The information generated through the field research has provided a rich insight and understanding of the way, livelihoods and CMT under marine management were interrelated in the past, within the three case studies. Livelihoods in the three villages were largely based on land and sea resources. Fishing was one of the main livelihood strategies people engaged in the case study villages. People fished to ensure food (protein) supply, and to make money, largely feather money. Some fishing techniques and gear were specialised while some were not. Gendered roles in traditional fishing were significant.

While CMT was regarded as a traditional marine resource management regime, other traditional management practices were also used in the three case study villages. Some of the management practices mentioned include traditional fishing techniques and gear, fishing and gender, traditional knowledge, seasonal closure and taboo. Traditional leadership governance, marine rights and boundaries were the important aspects of CMT. Customary marine resources management, under CMT, was considered by respondents to have been effective in the past and marine resources were remembered as abundant.

It was not until the villagers were exposed to outside influence (for example, the arrival of Christianity, colonialism and more recent self-government) that their livelihoods and customary marine resource management began to change. Other internal factors also contributed to the initial changes such as the historical patterns of settlements with the three case study villages. Initially, the pace of changes in the villages, in terms of their livelihoods and resource management, were slow. Also, the traditional setting used to work very well with the external factors such as Christianity. There appeared to be little dramatic change with most traditional practices still in place up to the 1980's. The later changes in the villagers' livelihoods and customary marine resource management over the last 15 years are discussed in the next chapter, Chapter 7.

Chapter 7: Changes to Fishing and Customary Marine Resource Management Under Customary Marine Tenure

7.1 Introduction

This chapter highlights the changes to livelihoods, fishing, marine resources and their management which have occurred in the three case study villages. The rationale for this chapter is to capture the past and contemporary setting of the phenomenon under study. Chronologically, this chapter provides the changes that have occurred over the last fifteen years.

7.2 Livelihoods: Changes

From the early 1980s till now, many changes have occurred in the three case study villages. This has meant changes in various aspects of the people's livelihoods (livelihood assets, institutions, processes, strategies, vulnerability context and outcomes). The changes are attributable to forces that are both internal and external to the villages.

7.2.1 Assets

Natural resources

Land and marine resources have remained the main livelihood assets in the three Case Study villages. BMO4 stated, "*...land and sea still provides most of the things we needed for survival*". There have been changes relating to the status, ownership, use and access to land and marine resources. While this section addresses changes relating to land, the changes relating to marine resources are discussed in Section 7.4.

According to most of the research participants from the three case study villages, scarcity of land is becoming an issue. Most of the research participants from Venga village mentioned that more land is being cleared every year to make gardens. In Neo the land area is smaller than the Venga and Graciosa Bay villages and most of its land and forest has been cleared to make gardens and cocoa and coconut plantations. From personal observations (May-June 2007) significant amounts of coastal land in Neo and Venga villages have also been turned into plantations. Most of the Graciosa Bay plantations are inland and fewer people own coconut plantations (BKIM1). The plantations are often permanent meaning that the land might no longer be suitable for gardening. Increasingly in Neo and Venga villages many villagers are engaging in forestry, by planting commercial trees such as Tick and Morgan.

Land issues such as deforestation were evident in the villages. Shifting cultivation is traditionally practiced, but has not worked as it used to. Fallow periods, which are periods when land is rested to regain fertility for future use, were used in the past. According to BMO3, nowadays the fallow period took fewer years than it used to, causing insufficient periods for the land to recover fully. In Venga

village, some of the female research participants complained about their root crops not bearing as much fruits as before. Deforestation is becoming one of the potential threats into the near future. BMY4 mentioned that the northern villages of Graciosa Bay have had their lands cleared for subsistence and commercial purposes. According to AKIM1, because so much forest has been cleared, some plant and animal species were driven away or have become extinct. As BMO3 said, *“hunting for wild pigs is no longer common here because homes of the pigs were destroyed”*.

Land disputes are also occurring in the three case study villages. Various socio-economic factors varying between the three villages have contributed to its occurrence. Some research participants mentioned that it is due to economic development while others strongly believed it is due to increases in population. As BMO4 mentioned, *“...Population increase had caused land shortage to make gardens. Land disputes sometimes happen between individuals, families, tribes, clans and villages.”* From personal observations and discussions, it was apparent to me that some villagers have sold some land. In Venga village, most of the coastal land (including shore areas and beaches) around Nela and Nelver (a settlement within Nela area) has been sold by the villagers to non-Santa Cruz people.

Physical assets

The kind of physical assets of villages varies from transportation, through to water supply and buildings. The discussion will be on the village, but what the research participants mentioned will be highlighted as well. In terms of transportation, Venga and Graciosa Bay have unsealed roads connecting them to Lata. Graciosa Bay road was recently graded. Five villagers also owned vehicles which often serve the villagers needs. In Venga village, two individuals used to own a vehicle, but now there is none. However, one government employee residing in the village, who is currently using his organisation's truck, sometimes helps out if a villager is in need, for instance in emergency situations. Since Neo is on an island, the fishermen's daily transportation to Lata serves as the main means of transportation for Neo villagers. Transportation fare is charged to villagers who want to board the fishing boats to Lata. A return fare per adult person is SBD10.00. I was told that only a few families and individuals owned an outboard motor boat and engine in the late 1980s, but now the number has increased.

In terms of water supply, Venga and Neo do not have proper water supply. They depend on wells and fresh water runoffs, during sea low tides, for drinking water and to do their laundry and dishes. Venga and Neo village both have two village tanks each of which serves the entire village and only a few villagers have private water tanks. Graciosa Bay has proper water supply (stand water taps between the village houses). While in the past they used to have stand pipes in each village nowadays some families have water supplied inside their houses. During my field work, their water supply was having mechanical problems. Villagers are now using wells for drinking water and freshwater runoffs to do

their laundry and dishes. Very few villagers own water tanks. The water problems have caused many villagers to aspire to buy their own water tanks.

Although many of the villagers' houses were traditional, more and more people are beginning to own permanent and semi-permanent houses. Here "permanent house" refers to a house built using timber, iron roofing and modern carpentry tools. Semi-permanent refers to those built with iron roofing but which have walls thatched with sago palm leaves. Timber is often used. Traditional houses use modern nails but basically are made of bush materials. People aspire to own good homes. In Venga village, most of the houses are traditional but increasingly semi-permanent homes are being built. Four homes are permanent buildings. In Graciosa Bay one third of the houses are semi-permanent and permanent and another third are permanent homes. The rest of the villagers have traditional homes. In Neo, a quarter of village houses are permanent while the rest are either semi-permanent or traditional. Most of the male research participants aspire to own more permanent homes.

Four private trade stores are currently (May-June 2007) operating in the Venga village and in Graciosa Bay. Each of the sub-villages can have two to four trade stores. Six trade stores are operating in the Neo village. Apart from the current trade stores operating in the three case study villages, some village trade stores have stopped operations due to various reasons. According to CKIM, some of the village fishermen own trade stores. Graciosa Bay and Neo have their own village clinics (village health centres). Their clinics also provide wireless services to the villagers. The Provincial community e-mail service, PFNet centre, is located in Graciosa Bay which opens for the public to use. In Venga village, the villagers have a public telephone, a service freely provided by the Telekom employee who resides in the village.

Other important physical assets are schools and church buildings. There are two primary schools in Graciosa Bay and one in Venga and Neo village. Some of these schools are being converted into community high schools. There are two church buildings in Venga (Anglican, Seventh Day Adventist), three in Graciosa Bay (Anglican and Church of Christ) and three in Neo (Jehovah's Witness, Anglican and Church of Christ). These different denominations have a considerable spiritual influence on the villagers' faith. Anglican is the dominant denomination in the three villages.

Financial assets

Modern money has fully taken over from the traditional functions of feather money, although feather money now has tourism value. Money is very important to the villagers because the village economy is now mainly using money for exchange, though the barter system is still present (but weakened). Moreover, money is crucially important for the villagers to meet their needs. Most of the research participants mentioned school fee payments, store food (noodle, rice, canned meat), kerosene, lamp, cooking utensils, clothes, smoke, betel nut and pepper leaf, transportation, medication fee, building

material and fishing gear (new ones or maintenance). Others mentioned cultural obligations such as marriage, death, and cultural ceremonies such as ear and nose marking (not common), helping siblings in times of need and compensation. And some are ambitious to get into formal businesses such as trade stores. The majority of the fishermen (Five from Venga, three from Graciosa Bay and five from Neo) mentioned that income generated from their fishing was used to pay for their children's school fees and stationery.

Cash savings are not common for individual households, although the number of villagers who have savings with the local Bank has increased over the last decade. Some of the research participants from the three case study villages have cash savings. Villagers often save in preparation for foreseeable cultural occasions or commitments, such as marriage, death ceremonies and ear and nose marking ceremonies. School fees and bride price payment are two of the most significant things that most of the research participants normally spend money on and these are also the main things they save for. People sometimes receive financial assistance from their siblings who are working and earning money. This form of assistance might require repayment. Helping relatives with school fees payment is done by some people. Some community institutions or groups have savings, for example, the church and the school. These savings come from different sources, both external and internal. The internal source is mainly from the villagers. In Neo, Tuesday's fish sales are sometimes allocated to the school if the school requests funding from the village or have a "fundraising". Also in Neo, a parent of a student can buy petrol and give it to the fishermen to fish for them. When the fisherman goes out fishing, the sales are given to the family concerned for their child's school fee. The fisherman often retains the rest of the money. According to CKIM, Neo fishermen do this out of their interest to help villagers who need their help. Trade between villages is no longer practised.

At the village level, there is a Rural Constituency Development Fund (RCDF) provided by the National Government, which is also available for the villagers to access for development projects. Micro funds are available for micro-enterprises from RCDF but one has to meet the requirements before being granted funds.

Human resources

The average number of children a young family can have in the case study villages is three while it is five for well established families (AKIM, BKIF, CKIM). According to the key informants, over the last decade, the number of children, including females, attending school has increased. In fact, it is part of the policy aim of the Ministry of Education and Human Resource Development to have all children nationwide attends school by 2015. Most of the research participants have their children attending school (primary or secondary). Very few students from Graciosa Bay and Venga have attained tertiary education or have commenced it. The tertiary students are mainly males. Education is

seen as an important investment. Therefore, parents are more than willing to send their children to school.

However, many villagers from the three case study villages have had some formal training as teachers, registered nurses (and nurse aides), doctors, mechanics, fishers, sailors, politicians, carpenters, and drivers. A considerable number of formally trained people work in other Provinces. Moreover, urban drift is increasing as more villagers go into town to look for jobs. For example, the Oil palm plantation in Guadalcanal Province has caused more villagers to go to Honiara to look for jobs there. Those who have left the village sometimes send money back to their families in the village, although this is not very common. Through the experience they gained from working in the village and Lata, many villagers have developed skills in carpentry, driving, sailing and fishing. At the village level, the Letaluas are important as they possess traditional knowledge and also are seen as the village role models.

Three male research participants from Neo and one from Graciosa Bay mentioned that they have had a history of formal jobs, but have left them due to the recent ethnic tensions in the country. When asked why they preferred fishing than taking up other formal jobs, the male research participant from Graciosa Bay strongly expressed that he cannot leave fishing because the opportunity cost will be high for him. The male research participants from Venga said they sometimes do temporary jobs such as shop keeping and carpentry. When asked why they do other jobs as well, AMY4 (interview, June 2007) said, “...*this is to supplement my income from fishing and also to help in my cousin’s business*”.

Cultural assets

Some of the cultural and social capital has significantly changed. For example, feather money no longer serves its traditional functions such as in bride price payment, but now a useful for sale in the tourism industry. Some artefacts such as tema and lerpa nesa and other cultural expressions are becoming important in the artefacts industry. One villager from Graciosa Bay is in his initial stages of starting up a private mini-village museum. That same person is engaging in tema necklace production as an informal business enterprise. Weaving of traditional baskets is also becoming an attractive market option in Graciosa Bay. Madai is still practised in the three case study villages, but more predominant in Venga village. Traditions of ear and nose marking are no longer commonly practised.

Social assets

The social resources that the villagers traditionally draw on to achieve their livelihoods objectives have also changed. The social resources among others include relationships, trust, reciprocity, sharing, respect, love and social networks. The relationships within the family have changed. Most of the older research participants in the three villages expressed that the parent/children relationship is not the

same as they have experienced in the past. As AFO said, *“the young generations don’t listen to their parents like we used to do in the past”*.

The relationship within and between families or extended families is different from what it used to be. For example, helping in the garden is no longer done by the extended family, rather the immediate family members do it. Some women hire villagers to clear, harvest or cultivate the garden for them. As, BMO4 said, *“in the past my extended family member will come and help me in planting and harvesting, but now they rarely help out. So I sometimes hire people to help my family make gardens”*. From personal observation, some people, especially those who are working or businessmen sometimes employ members from their extended family in return for money. Labour is increasingly rewarded with money. In Neo, most offshore fishermen often hire village men and boys to help them fish. These men help in the tasks involved while they are out in the ocean, such as pulling the fish, throwing the line, and cleaning the fish. They also do the marketing in Lata. However, individuals and families are still part of their tribe, clan or extended family in other ways such as in terms of land ownership. All the tribe members own the land but in some cases a few members of the tribe (especially males) try to use most of the tribal land by themselves.

In the wider community, the level of cooperation differs in the three villages. For example, in Venga village and Graciosa Bay the level of cooperation concerning village tasks is quite low and lower than in Neo. According to the three villages’ key informants, the level of cooperation is high when their benefit is mutual. Law and order is one of the concerns in the three villages. The specific issues differ in the three villages. For example, theft issues are more pronounced in Venga village than the other two villages.

Many villagers have networks external to the village. For example some fishermen have connections with private marine product buyers in Honiara whom they sell their fish or other marine products. Women in the village are part of the larger Ecumenical Group (EG) and the Provincial Women Centre (PWC). The EG focuses on the Christian principles that mainly relate to marriage life and Christian roles of wives. The EG involves women from different villages encouraging each other. Every year they come together in a pre-determined village. The PWC is a centre for women to learn and exchange their expertise in such things as cooking and craft making. It is also part of the PWC’s plan to create a market for village women’s craft production. These centres have influenced many village women to venture into minor income generating areas such as craft making.

7.2.2 Institution and processes

Apart from the traditional institutions and processes, other institutions and processes have been introduced to the three case study villages. For example in Venga a health committee was set up to take care of village health issues (e.g., village clean-ups). It is no longer effective. They have village

chief's council. The council of chiefs' responsibility is to maintain and enhance law and order in the village. The council of chiefs are constrained with some factors. These chiefs are elected by the villagers during village meetings. In Neo they are currently at their initial stages to set up a "Neo Fishing Association". According to BMO3, who is the leading person in negotiating these proposed associations with the Fisheries officer, this is going to be the main buyer of fish in the Province. In Graciosa Bay there is the "Graciosa Bay Businessmen Association". This Association is very influential in the business environment throughout the Province. For example, the Association often charters ships to and from Honiara to serve their business needs and other businesses in the region.

The traditional political and economic system and church institutions still exist but have undergone significant changes. For example, there is now an overlap between the role of the Letaluas and the government or public sector. Law and order in the village is now very much in the hands of the council of chiefs. The council of chiefs now largely handles law and order in the village. The influence of village church leaders on the village is still there, but not the same as prior to the 1980s. For example, in the past during church festival preparation, when the church keepers say something everybody followed it but now their collective control has weakened. While this is true for some denominations, other denominations maintain a high level of co-operation between church leaders and the congregation.

In many ways, these village institutions can have considerable gaps or tensions between them, though in some ways they have built on each other. For example a decision that might be reached by the council of chiefs might not be agreed on by the school or the church leaders. Harmonising the customary land tenure with economic development is a big issue. Moreover democracy which has "individual rights" as the centre, undermined the collective nature of the traditional way of living in the villages. Despite these issues, these institutions have also built on each other. For example, law and order seemed better managed by the public institutions including the village chiefs (elected). The modern punishment measures often cause people to refrain from breaking the law.

7.2.3 Livelihood strategies

The villagers engage in a wide range of livelihoods strategies to make a living. These include food production (gardening, fishing, agriculture) for income, food or exchange, forestry, paid jobs (seasonal, part time, permanent), small private businesses (trade store, kerosene sales, petrol sales, poultry, piggery, etc.) or money received from working relatives. As mentioned above, food is mainly planted and gathered directly from the gardens. Women (plus daughters and younger children) are largely responsible for the garden making, though sometimes helped by their sons or husbands. Most village men and women are not formally employed, but engage in different activities to generate income. Women often sell the surplus from their garden produce. They are increasingly venturing into other areas like sale of fish with pudding, kumara and other root crops. The women also make fish and

chips which from personal observations are becoming common and are often supported by their husbands who provide the fish. Many of the village women also engage in craft production and sales. These include basket weaving, macramé, home knitted tea towels and table cloths.

Some of the male research participants engage in forestry. They plant Tick and Morgan which are economically valuable. During the time of research some Agricultural officers visited Neo men to give them technical information relating to the Tick and the Morgan. Copra production is common in Venga and Neo but uncommon in Graciosa Bay. As mentioned above, people often make copra 2-3 times in a year. Some research participants have plantations of their own while others depend on their family-owned coconut plantations. These family-owned plantations are used by all the immediate family members. Increasingly a few villagers buy raw coconuts (removed from shells) from other villagers, dry and sell them. Most of the male research participants from Neo also produce cocoa. Some of them buy from the villagers and sell them to buyers in Honiara or Lata.

Artisanal and subsistence fishing are also important livelihood strategies. A minority of the villagers take up formal jobs which are either full or part-time. Those with permanent jobs are normally those who have experience and qualifications and are employed by the government (Provincial and National). More villagers are venturing into private trade stores (many in Graciosa Bay and less than ten in Venga and Neo), small scale kerosene sales shop (six in Venga, six in Neo and many in Graciosa Bay) and petrol sales (two in Venga, three in Graciosa Bay and many in Neo). Some of the shops in Lata are owned by villagers from Graciosa Bay and Venga village. None of the research participants own shops in Lata. Through experience three research participants from Venga village have become talented carpenters and are now running their own carpentry contracts in Lata. Two villagers from Graciosa Bay and one from Venga village engage in poultry, though many villagers look after local chickens as well. Feeding of pigs is traditional and is still common in Neo and Venga village. Two research participants from Graciosa Bay mentioned that they also have piggeries. A piggery is regarded as one of the most important sources of income for the villagers. Pre 1980s, two villagers from Venga and three from Graciosa Bay engaged in cattle farming but their livestock has decreased. None of the research participants engage in cattle farming.

7.2.4 Risk and vulnerability context

The villagers' livelihoods are vulnerable to different environmental, economic, social and political factors. Temotu Province is always at risk of cyclones. Cyclone Nina in 1993 is the latest devastating cyclone that has hit Temotu Province. It has had considerable effect on Venga and Neo. For example, in Venga 80% of the homes were washed away by the waves, including property (tools, pigs, etc). In general, these cyclones have destroyed reef barriers (Venga and Neo) and have caused erosion or inundation (Venga). Three research participants from Neo felt that cyclone Nina had contributed a lot to the decrease of shells on their shore. Sea level rise is another environmental threat. In Venga

village, some parts of the main road linking the village to Lata are continuously eroded by waves. Some parts of the shore that used to be part of the land are now under the sea. In Neo, some of the villagers told me that drinking wells are not as fresh as before as the sea level continued to rise over recent years.

Moreover, agricultural crops such as coconut are also affected by a pest (beetle). It affects the leaves and the fruit (not able to bare many fruit and spoils the flesh). Root crops such as taro, kumara, and yam are often eaten by rats and beetles. Four female research participants from Venga and Graciosa Bay complained of their root crops not bearing more fruits compared to the past. From personal observation, it appears that their crops grow very well in Neo because of the fertile volcanic soil especially when compared with the poorer soils of Venga and Graciosa Bay.

The villagers are also economically vulnerable in terms of their remoteness. There are limited buyers of agricultural products such as copra and cocoa within the Province. Because of this, villagers often sell their products to Honiara buyers taking advantage of the price variations. Several years ago, many villagers were discouraged from producing copra due to very low copra prices.

In terms of fishing, fishermen mentioned that they can produce more, but there are no proper storage facilities and the limited buyers in Lata only buy up to what they can store. Some of the buyers in Lata have stopped operations. Some fishermen sometimes send their fish to buyers in Honiara, but not frequently due to transport inefficiencies. The Fisheries Extension office also buys fish (snapper) from village fishermen and ships them to Honiara. However, the Extension Office's storage facilities can not accommodate all the villagers' catch. Lata fish buyers are not stable and are not sufficient to meet the supply, despite the high demand of fish in Lata (Informal interview with Lata buyers, June 2007).

In addition, anything that is contradicting or perceived as threatening to the village customs is also considered as a risk. Such threats are often from external sources or foreign influences. For example, in the 1990s, Letaluas from Venga banned females from wearing trousers in the village although this has now been released. Women are still not allowed to walk past the madai in Venga, but this no longer applies strictly in Graciosa Bay and Neo.

Some of the female research participants expressed concern that habitual beer drinking is causing problems for their families, particular as surplus money was spent on beer instead of being saved.

7.2.5 Livelihoods outcomes

When asked what kinds of things they aspire to achieve in life, "food and money" were frequently mentioned by the village research participants. Making gardens is a traditional way the villagers to ensure food security. Food security was more emphasised by the female research participants than the

male research participants. Most of the female research participants from the three case villages mentioned that most of their food comes from gardens. Few of the female research participants mentioned food from stores but this often supplemented what they got from the garden. For example they sometimes get rice, noodles, tinned meat, and cooking oil from the shops. Villagers aspire to earn and have money as it enables them to buy what they need and save some money in the Bank. From personal observation, female villagers are increasingly aspiring to own modern things. For example, more and newer styles of clothes, cooking utensils, cutlery and other things that they want to beautify their homes. On the other hand males, aspire to earn more money, to venture into trade stores and secure their own status.

Apart from the above, other aspirations include, gaining status and prestige, having a house, conforming to government and village laws and cultural norms, upholding of Christian principles, having better education and jobs. In general the villagers want to increase their well-being.

7.3 Livelihoods and fishing in the contemporary context

Fishing in the contemporary context is done quite differently from how it was done in the past, but nearshore and offshore marine resources are still harvested for livelihood purposes.

7.3.1 Fish as a source of protein and income

Protein

Table 8 below summarises the number of days the villagers eat fish, including any other edible marine resources.

Village	Number of days per week							
	0	1	2	3	4	5	6	7
Venga	Low	Low	Moderate	Moderate	High		High	Low
Graciosa Bay	Moderate		High		Moderate	Low		
Neo	Low		Moderate	High	Moderate		High	Low

(Key: Low = very few villagers, Moderate = some villagers, High = many villagers)

Table 8: Marine resource consumption per week

Fish remained the main protein source in Venga and Neo but at a lesser extent in Graciosa Bay. This is due to the fact that it is easier to fish in Venga and Neo than in Graciosa Bay because fishing activities, especially nearshore fishing activities, are more common there than in Graciosa Bay (informal conversation, June 2007). Nearshore fishing activities are more common in Venga and Neo because their nearshore marine resources are considered many, though have decreased compared to the past. On the other hand, offshore fishing, in Graciosa Bay is done mainly by villagers in the

northern sub-villages, and a few male villagers in the southern sub-villages (personal observation, June 2007).

Buying fish is more common in Neo and Graciosa Bay than in Venga. Several research participants expressed this in the following statements:

“...people from here (Graciosa Bay) normally buy fish from Lata markets, though sometimes they buy fish from fishermen/women in the village. This fish are often sold on road stalls” (CFO5).

“...nowadays fishermen/women don't give their fish for free unlike in the past” (BMO1).

“...fishermen from Neo always sell their catch at Lata. I eat fish only when I buy fish from the fishermen or when my son who is in Honiara comes to visit me” (BMO3).

According to some research participants from the three case study villages and from personal observations (May-June), fish, including other edible marine resources are considered the main source of protein. Alternative sources, such as pork, beef and chicken, are not common. Pork and beef are often available only during special occasions. Moreover, canned meat from the shops is quite expensive for the villagers. For example, one big fish can cost SBD10.00 and may be enough for the family. One tin of corned beef from the shop costs \$12.00 but may not be sufficient for the family.

Income

Fin-fishery (nearshore and offshore) was not only a source of food but also the main source of income for those who engaged it. Four fishermen from Venga and three from Graciosa Bay mentioned that when their catch is not good (not plenty and mainly small ones) they did not sell them but rather, they used them for food. When their catch is good, they sell most of their catch but give the small ones (often regarded as good for eating but not good for selling) to their immediate family (wife, husband and children) or nearest kin for free. In Neo, every day's catch, for most offshore fishermen, is always sold at Lata (most of the catch) and in the village (few of the catch).

As a yard stick, a fisherman can earn between SBD\$300.00 (NZ\$40.00) per day and SBD \$500.00 (NZ\$45.00) per day (interviews, May-June 2007). Unfortunately, these values cannot be compared to the Provincial average daily income as the information is lacking. But being from the Santa Cruz Islands, my personal experiences suggest that this is a significant amount for a villager to earn in a day. Because of this, two fishermen jokingly said,

“...why should they take up another job other than fishing? There is good money from fishing” (AMY4).

“...my father told me to search for a formal job again but I refused because, I can not earn this kind of money if I were to take up another formal job other than fishing. For example, I might earn SBD\$300.00 in one month in taking up a formal job, but can earn thousands in less than a week” (CMO4).

The fisherwomen often sell their catch with cooked food. Sometimes they make fish and chips and sell them in the village or at Lata market. They can earn between SBD\$50.00 and SBD\$100.00 per day.

Most of the village research participants, mentioned that they also generate “good” money from non-fin fisheries as well. These include sale of bech-de-mer and trochus.

7.3.2 Motivations for fishing

When asked why they engaged in fishing, the research participants provided a wide range of reason (see Table 9 below).

	Venga	Graciosa Bay	Neo
Why fish?	How many?	How many?	How many?
Because I want to eat fish	5F, 3M	3F, 2M	4F, 2M
Because I have a payment to settle, like bride price payment	6M	4M	6M
Because I need kerosene, and some things from the store	3F	4M, 2F	1F, 6M
Because fishing is easy and quick money	3F, 5M	2F, 4M	6M
Because fishing is big money compared to what I might earn from taking up a formal job	1M	3M	2M
Because it is my main source of income	3F, 5M	2F, 3M	6M
Because I need to pay for my children's school fees	2F	1F, 1M	2M
Because it is what my father (mother) and ancestors engaged in	5F 5M	4F 6M	5M
Because I saw others doing it so I decided to do it too	1M	3M	4M
Because no one is there to fish for me	3F	3F	3F
Because meat from the shop is expensive and because	3F	3F	3F
There is no other cheaper protein alternative. Chicken (\$50) is too expensive and pork and beef are not common)	2F 3M	3F 3M	3F 5M
Because I don't have coconut plantation to make copra	2M	2M	3M

(Key: M = Male, F = Female)

Table 9: Reason why the research participants fish

Two older research participants from Venga, four from Graciosa Bay and one from Neo told me that they have lost interest in fishing or shell collection because marine resources are not as easy to get as before. The number of fishermen and women in the three villages has increased over the last five years.

One of the main points that came out during the research is “why and when” people shift to and from land and marine resources to generate income and produce food. In terms of income generation, land limitation is one of the reasons that caused some fishermen to fish. For example, CMO3 said, “*because here at Uta we are located on the edge of the Graciosa Bay boundary and therefore we do not have enough land to plant coconut to make copra ... so I decided to engage in fishing. In fact, I am earning more from fishing...*” The unstable and sometimes unattractive copra and cocoa prices, and the labour input involved plus the unreliable transportation, averaging approximately once a month to and from Honiara, are also causing more villagers to opt to fish to generate income. Some research participants sometimes took advantage of the shipping schedules. They temporarily engage in agricultural production when they know that a ship is coming to Temotu Province. For example BMY5 said, “*...when I know that ships are coming from Honiara, normally around May/June and November/December, I decided to dry copra. When the ship comes then I take or send my copra bags to Honiara. I often send my copra bags to Honiara because the market price there is often higher than here (one buyer)*”. According to the villages’ key informants, villagers from the three villages exploit both land and marine resources to make the most from all the resources available and accessible to them to earn money.

7.3.3 Fishing: Nearshore and Offshore

Nearshore: Marine species harvested

Contemporary fishing involves the harvest of a wider range of near and offshore marine species in Venga and Neo than in Graciosa Bay. The harvested nearshore marine species include various species of shells, reef fish, and offshore fish. However, the kinds of marine species harvested by each village may differ depending on their availability and abundance in the three case study villages.

Marine Species	Nearshore	Offshore
Shells	Coiya (V,N), Peli (V), Numbli (V,N), Benia (V), lau, Nibulala (V), Nesau (V), Ler (V), Dambu (V), Erda (V), Nibupir (V), Besingake, Hawaiian shells (N)	n/a
Fish	Erpe (V,N,G), Bu (V,N), Jo'ober (V), Nerer (V,N), Terblaile (V,N,G), Blapu (V,N,G), Birlu (V), Na e'er (V,G,N), Dirlve (V), Lve'e (V), Nugir (V,N), Terklava, Tamo (V,N), Mo (V,N), Bealir (V), Nereliu (V), Bopri (V), Blesikir (V,N,G)	Shark (V,N), Snapper (V,N,G), Barracuda, Other offshore fish types
Coral	lu oterpia (V), Lirda (V)	n/a
Sea Slugs/Cucumbers	Tekave (V), Wangi (V,N), Be (different species) (V,N,G)	n/a
Seaweeds	Lolir (V), nimu erli (V,N)	n/a
Crabs	Lenga (V,N), Lo yam (V,N), Webu (V,N), Lodei (V,N)	n/a

(Keys: V = Venga village, N = Neo village, G = Graciosa Bay)

Table 10: Commonly harvested marine species by villages

Research participants from Graciosa Bay claimed that edible shells living on shore rocks and reefs have decreased and therefore they are no longer harvested. Some have been depleted or are now very difficult to find as CMO3 said, “...*benia (trochus) and lau (green snail) have depleted and cannot be found easily anywhere on our reef*”. And CFO2 said, “...*we no longer look for shells because there is no more on the reefs*”. This is the same with other nearshore marine resources such as fish, coral, sea slugs and cucumbers, seaweeds and crabs. However, all research participants from Venga and Neo considered that their nearshore marine resources have also decreased compared to what they used be in the past.

The changes in nearshore marine resources that the three case study villages have appeared to have caused changes in the extent to which the villagers engage in nearshore fishing activities. The collection of shore shells, though not very common nowadays, is still practiced in Venga and Neo but not in Graciosa Bay. Four female research participants (three older and one younger) from Venga stressed that they no longer collect shore shells because shells are now hard to find and AYO2 said that she stopped collecting shells on the shore because she is no longer interested in collecting them. Two (a male and a female) research participants from Venga said that sometimes they dive for clam shells for sale. They sometimes dive upon paid request.

BFY1 mentioned that many village women (including children and teenagers) from Neo engage in collecting “Hawaiian shells” to make craft using strings or macramé. They learnt this from the Women’s Centre Workshops in Lata. From informal conversations with village women, this craft making is also done in Graciosa Bay and Venga but is not as popular as in Neo. According to BFY1,

recently some husbands of the Neo women who engage in making macramé, started to help their wives and children to collect the shells after realising the attractiveness of the macramé sales. She also mentioned that those who do not make macramé often collect the shells and sell them to the weavers. Hawaiian shells are not common in Venga and Graciosa Bay (personal observation May-June 2007).

Four female research participants from Neo and two from Venga said they used to collect sea slugs (wangi and tekave), but less often now because they are very hard to find. All female research participants from Graciosa Bay stressed that sea slugs are scarce on their reef. Seaweeds are another kind of marine resource that women collect. Four female research participants from Venga mentioned that they used to collect seaweeds such as lolir. However, they rarely collect them now because lolir are no longer plentiful. Apart from that most villagers now tend to prefer marine species other than seaweed.

The villagers in the three case study villages collect sea cucumbers, both during the day and in the night. According to the collectors and village key informants, they preferred collecting them during the night because it is when the sea cucumbers are exposed in large numbers. Sea cucumbers are found mostly in deeper waters during the day (interviewees and key informants, May- June 2007). Three male research participants (two old and one young) from Venga village believed that sea cucumbers have moved further into the deep waters because the nearshore reef temperature is no longer conducive for them as the shore trees that used to provide them with shade, were removed. After the sea cucumbers are dried (referred to as bech-de-mers), they are sold to buyers in the village, provincial buyers or buyers in Honiara. According to CKIMO1, in the past there were buyers in the village. In the other two villages (Venga and Graciosa Bay), there has never been any village buyers.

The sea cucumber harvest started in the 1980s when the Solomon Islands Government introduced a market for it (AMY1). Three male and two female research participants from Venga who do not harvest sea cucumber for themselves sometimes helped their children to collect and dry them. Four research participants, including two women are involved in sea cucumber collection. They “*collect them bit by bit*” (AMY1). One of the four who collects sea cucumber has quit because he does not like the smell of it (AMY1). According to AKIMO1, many teenagers, including females are engaged in collecting sea cucumbers. In Neo, none of the research participants collects sea cucumber, except for CFO3 who mentioned that she does not collect sea cucumber but only helps her 14 year old son collect them. However, BKIFO1 and BKIMO mentioned that some Neo villagers also collect sea cucumbers. None of the research participants from Graciosa Bay engage in sea cucumber collection, and CMO2 pointed out that there are very few villagers who engage in it. He claims that they harvest sea cucumbers only in the outlying sub-village reefs, for example Nemu reef.

All the older research participants from the three case study villages mentioned that sea cucumbers have been depleted. Those research participants who engaged in collecting sea cucumber pointed out that sea cucumber are now hard to find and only in the deeper reef edges. Most research participants said sea cucumber has decreased because they were over fished, collected during the times they should not be collected, collected too frequently, collected with improved gear that increases the amount collected, and that small and female ones are collected and their breeding grounds are destroyed.

Many types of fish species are harvested on nearshore reefs using many types of fishing techniques. Venga village harvests a wider range of fish species than the other two villages because Venga has a wide coral reef which is lacking in the other two villages. However, most of the research participants (male and female) except for the older ones, engage in nearshore fishing activities. None of the younger male research participants from Neo engage in nearshore fishing.

Offshore

A number of offshore marine species are harvested (Table 10). In Neo, BMO2 said, “...*bonito fishing and drop fishing have just started. Drop fishing started after the fishermen discovered that their offshore fishing ground was shallow enough for them to and it is now the most fished offshore marine species*”. Only the male research participants engage in the offshore fishing in the three case study villages. Most of them were between the ages of 20 and 45. In Neo, the fishermen often hire villagers to assist them in fishing. This is not the case in Venga and in Graciosa Bay. Each Neo fisherman can hire two to four village boys. These fishing assistants often market the fish in Lata. They are paid by the fishermen who hired them. The fishermen often train these fishing assistants during initial fishing trips with them. According to BMO2, the fishing assistants were informally employed by the fishermen. The fishermen often provide all the fishing gear, including the boat and engine and meet the cost of petrol.

7.3.4 Frequency of fishing

According to the villages' key informants, villagers fish on the nearshore reef almost every day and any time they want to. Most of the female research participants told me that they go out fishing whenever they want to eat fish or edible shell fish and also when they are free. Four research participants from Venga, two from Neo, two from Graciosa Bay said they go out fishing six days a week because there is always an urge in them to fish often. Not only that but they want to have fish as part of their everyday meals. Some stressed that fishing is their source of income. One research participant from Venga and two from Neo said they often go out fishing three to five times in one month. One research participant from Venga village, three from Neo, and four from Graciosa Bay said they fish once or twice a year. They are not motivated to fish because of the difficulty in catching fish and finding shells resulting from the decrease in marine resources.

Most of the male research participants go out fishing everyday. For example, in Neo in the three case study villages, offshore fishing is often done on a daily basis. From personal observation (June 2007), this routine is more structured in Neo village than in the other two villages. For example, the fishermen from Neo normally depart between 3:00 or 4:00 am and normally arrive ashore at between 10:00 and 1:00pm. When they arrive, the fish will be cleaned. The cleaning is sometimes done by village women who often wait at the passage. They are often paid for their service. Villagers wanting to buy will also be waiting at the passage. The fishermen and his assistants often rest for an hour. After that they will leave again sell their catch in Lata. The table below provides the number of times each research participant fished offshore during the week.

	1-2 days	2-3 days	3-4 days	4-5 days	6-7 days
Venga	0	2 fishermen	0	2 fishermen	4 fishermen
Graciosa Bay		2 fishermen	3 fishermen	3 fishermen	0
Neo	0	0	0	2 fishermen	6 fishermen

Table 11: Number of days the research participants fish offshore by village

When the fishermen do not go out fishing they either help their wives in their gardens or engage in other livelihood activities. Two research participants from Graciosa Bay and four from Venga said they sometimes go out fishing in the night because they normally help their wives in the garden during the day. One out of the four research participants from Venga said he works in a shop during the days he does not go out fishing.

Going out fishing on Sunday was traditionally forbidden by the village leaders. However, from personal observation this tradition has changed. Some villagers do fish on Sunday. As AMO2 said, “*the church keepers and the village Letaluas used to say that people should not fish on Sunday*”, but some villagers tend to ignore it now “*its kind of up to any body whenever they want to fish or collect shells during the week*”. This is due to the changing levels of respect that villagers have for village leaders and the cultural values that villagers have for such traditional practices.

7.3.5 Fishing techniques and gear

All research participants commented that most of the traditional fishing gear and techniques used in the past have been replaced by modern versions or have been modified. The traditional knowledge and skills about specialised and unspecialised traditional fishing gear and techniques is no longer possessed by many villagers. Only older villagers possess them.

When asked why they prefer using modern fishing gear or techniques, the frequent answer given by research participants is that “*...if one tries to carry out the traditional fishing techniques or use traditional fishing gear he or she will catch very few (<10) or no fish at all*” (AMO2). Most of the

research participants (mainly in Venga and Graciosa Bay) considered that fish have been threatened by the initial and continual use of modern fishing nets. For this reason, most traditional fishing techniques and gear, which the villagers considered part of the traditional management practices, are no longer considered suitable. For example, AMO2 said, “...if one decides to carry out *lenialu* fishing and uses coconut fronds as the net, he will not catch any fish at all. All the fish will run away from him”.

There are various types of fishing gear and techniques presently used in the three case study villages. Both men and women engage in them. The nearshore *fishing gear* now used includes dug out canoes, diving glass and rubber, knives, spears (made from iron rods), fishing nets, bamboo, string and using crab or hermit crabs as bait. Poison leaves to feed fish with are also used. The research participants who are involved in sea cucumber collection use home made spear guns which they call “rockets”. It is a hook like spear tied on to a rope. It is usually fired down directly towards spotted sea cucumber. When it reaches the sea cucumber the rope is pulled up with the sea cucumber hooked onto the spear (interviewees and key informants, May-June 2007). The divers told me that use of the home made spear guns was recently introduced by the villagers. The reason being most sea cucumbers are found in areas one cannot reach with breath-holding diving.

Likewise all research participants said that nowadays the villagers use modern (some modified traditional fishing techniques) fishing techniques. The modern nearshore *fishing techniques* frequently mentioned include string fishing on canoes (Venga, Neo), diving with spears and diving glasses (all three villages), nomer fishing (Graciosa Bay, Venga), net fishing (Venga, Graciosa Bay), clam shell diving (Venga), drop fishing with diving glasses (Venga Neo) and drop fishing with stones or iron rod using canoes (Venga, Graciosa Bay). From the interviews and my personal observation, offshore fishing techniques are continually modified in an attempt to increase fishing efforts. For example, some of the fishing techniques used in the past are no longer practised or now uncommon in the three villages due to decrease of marine species and less suitability in the current fishing context.

Fishing techniques	Venga	Neo	Graciosa Bay
<i>Nearshore:</i>			
1) kite fishing	NC	C	NC
2) tou er merlir	C	NC	C
3) tou er malibir	C	NC	C
4) turtle netting	NC		
5) ner tulegirnga	NP	NP	NP
6) ner er fishing	NC	NC	NC
7) collecting of trochus	C	NP	NP
8) bernoku	NC	C	NC
9) ber nalir	NC	C	NC
10) buri with birlirlir	NP	NP	NP
11) lenialu	NP	NP	NP
12) collecting/digging shells	C	NC	NC
13) collecting tekave	C	C	NC
14) collecting sea slugs	C	C	NC
15) collection of seaweeds	NC	NP	NP
16) fish poisoning	NC	NC	NC
17) bamboo fishing	C	NC	C
18) lighting of fish in the night	NC	NC	NP
<i>Offshore:</i>			
1) shark fishing	C	C	C
2) drop fishing	C	C	C

(Keys: C = common, NC = not common, NP = no longer practiced)

Table 12: Nearshore and offshore fishing techniques (by female or male)

Also, new styles of cutting baits and tying hooks were introduced. Also fishermen have increased the number of hooks that can be tied on one line, from one to five using shiwals. Some of the newest fishing techniques include strike line and kura.

According to the research participants offshore fishing requires more “powerful and specific fishing gear”. While most of the gear used is similar to most nearshore fishing gear, the fishermen use larger strings and new types of hooks which they claim to be more effective. The fishing gear used by fishermen in the three case study villages was slightly different. In Venga, the fishermen sometimes use rafts to attract fish which they often use as bait, while Graciosa Bay and Neo do not. Coleman lamp is commonly used by the fishermen in the three case study villages to attract baits in the night (AMY4 and CMY3). However, false baits are increasingly used by all the offshore fishermen.

According to personal observation many Neo offshore fishermen seemed to be better equipped with offshore fishing gear than the other two villages. In terms of outside experience, two of the Neo fishermen have had prior experience with National fishing companies in the Solomon Islands and have been formally trained. These two experienced research participants believed this has contributed greatly to their fishing knowledge and skills in offshore fishing. Moreover, through their experience they were able to acquire and use more advanced offshore fishing gear. Some offshore fishermen from Neo are now using compasses to navigate when they go out fishing. This has enabled them to fish over larger sea areas. None of the research participants from the other two villages have had formal experience but rather, learnt fishing through someone from within their village (most) or their fathers (many from Venga and two from Graciosa Bay). They do not use compasses.

In terms of transportation, all the research participants from Venga and Graciosa Bay, involved in offshore fishing use dug out canoes and wooden paddles, except for AM3 who said he used to use an outboard motor boat and engine which he had borrowed. All the offshore fishermen from Neo use outboard motorboats and engines. According to BMO2, initially few fishermen owned and used outboard motor boats but over the last decade the number has increased.

7.3.6 Women's involvement in contemporary fishing

According to most of the older female research participants many more women now engage in fishing than in the past. As AFO2 said, “...*nowadays many women know how to fish, while in the past not many women fished*”. However, most of the older research participants mentioned that they were no longer interested in fishing. Three female research participants from Venga no longer engage in fishing because their husbands often fish for them.

Four female research participants from Venga, one from Neo, two from Graciosa Bay are engaging in fishing to generate income. According to the village key informant there are other women and teenagers in the village who also generate income from fishing. From personal observation most of the women are single mothers, widows, teenagers, those whose husbands are working in other provinces and those whose husband do not actively engage in fishing. For example, one woman from Venga mentioned that initially her husband (who is from another island) did not know how to fish. So he used to tell her to fish for him. Over time she taught her husband how to fish. She taught him the nearshore fishing techniques. Now he is very good at fishing. The couple often fish together for consumption and sale purposes. Her husband now joins the fishermen from the village to fish offshore. The practice of a woman engaging in fishing for income purposes is more common in Venga than the other two villages.

The female research participants often used the money they earned from sales of fish or shells to meet their families' basic needs, including school fees and social obligations such as bride price payment.

For example, one of the four research participants from Venga mentioned that she uses some of the income she earned from fishing to buy her son's school fee. One of the two women in Graciosa Bay said sometimes she used the money to help out her family with bride price. The rest of the women use the money to meet their basic family needs such as kerosene, store food.

Another thing that came out from the interviews is that women are increasingly engaging in fishing techniques that are regarded as men's. For example, string fishing on canoes (all Vengan female participants, two from Graciosa Bay), drop fishing using canoes (3 from Venga, two from G/Bay), drop fishing using diving glasses (three from Neo), net fishing (one from Venga, two from G/Bay), buma fishing using Coleman lamps in the night (two from Graciosa Bay), and tou line fishing (three from Venga). From personal observation diving with spear and diving glass is only practiced by females in Venga. Women not only engage in men's fishing techniques but they also use fishing gear that men use. For example using canoes, strings, hooks, and fishing nets. Most of the older research participants stressed that these are all foreign to the villages. The use of fishing nets and Coleman lamp in buma fishing in the night by women is recently introduced. Two women from Graciosa Bay engaged in this kind of fishing. Those women who engaged in these fishing techniques mentioned that they are happy using them because it increases fishing effort.

According to my personal observation individual families often co-operate actively in fishing activities to generate income and two female research participants from Venga mentioned that sometimes they fish together with their husbands. AFY6 said her siblings, including her husband often fish together when they use nets. She also does drop fishing together with her husband. AFY5 engages in clam shell diving. Her husband sometimes helps her to dive for clams when the demand is high (upon orders from buyers). Three female research participants from Venga and two from Graciosa Bay mentioned that their husbands normally fish for them. They said it is a mutual agreement between them and their husbands. Their husbands will fish for them and they will prepare the pudding (baked crated cassava with coconut milk), kumara, or yam. The fish and pudding or kumara is often sold together in the village or at the Lata market. I have observed that for many women from Venga village who engage in this, their husbands are fishermen. Increasingly some teenagers (not necessarily daughters and females) and mothers are doing it.

7.4 Marine resource management

It is really apparent to the interviewees that marine resource management has changed and not for the better. As AFO2 said, "*...the way people look after the marine resources are now all over the place*". But not everything has changed and it is useful to consider the management closely. At the village level, the kinds of management measures imposed involve a taboo on certain fishing techniques, fishing gear, marine species, and on a particular fishing ground. This is the same for all the three Case Study villages.

7.4.1 Boundaries and rights

All of the research participants mentioned that the way marine resources are managed has changed from the way Letaluas managed it in the past.

Some things have not changed. Rights to village reefs are still in the hands of the villagers and the villagers are free to fish anywhere within the entire village reef. For example, in Venga village people from Manobu are free to fish anywhere they want to at Biakio reef. Nearshore boundaries between villages are still observed. This means people from Venga can not fish in Graciosa Bay. However, two research participants from Venga mentioned that some villagers from their village were sometimes asked by their friends from other villages to fish with them in Venga nearshore reefs. They mentioned that such invitation is often without consultation of the village leaders. Such invitation is often for subsistence purposes or part of helping each other and gives a level of legitimacy to the non-Venga villagers fishing activities. These two research participants mentioned that outsiders coming into the village for commercial purposes are strictly forbidden. It is a sensitive issue whereby the leaders will use their authority to intervene and tell the villager and the person invited to stop.

Likewise, offshore reef boundaries are still observed. For example, four fishermen from Venga mentioned that they often ensure that outsiders do not fish in their offshore reef. According to most of the research participants from Graciosa Bay, reef boundaries and rights are strict between the sub-villages located at the southern end of the Bay (e.g. Balo, Pala).

7.4.2 Management decisions and responsibility

According to most of the research participants the management of marine resources at the village level, is still largely in the hands of the village leaders. The village leaders include the traditional village Letaluas and Bonias (plus some household heads), and the elected village chiefs under the modern government system. The Ward member often works together with the traditional village leaders and the elected village chiefs to make decisions about their marine resources.

In Venga village, most of the research participants expressed that nowadays there is a need for traditional leaders and modern leaders² to work together because the effectiveness of traditional leaders on the village has weakened. As AMO1 said, *“management nowadays have to be supported by the chiefs and leaders under the modern government system because village people no longer obey what we say”*. At the village level, the village leaders can impose management measures on their respective village reefs. In Venga village, so far the village leaders have placed taboo (years) on one

² I prefer calling the chiefs and the Ward member as modern leaders for convenience purposes and refer to both leaders as village leaders.

part of their reef twice (late 1980s and in the 1990s). Till then there was none. During the times they imposed the taboo, a number of fishing techniques were banned such as diving with spears and use of fishing nets. According to AMOI, traditional village leaders in the past told the villagers not to use fishing nets but most have ignored it. He said the reason being those people who have used it were attracted by the money they could earn from using fishing nets. Also those who engage in using fishing were village elders and to continually approach them to get them not to use fishing nets is inappropriate. They are expected to know what to do. For this reason, use of fishing nets increased and is still practiced. The same kind of issue is also mentioned by research participants from Graciosa Bay.

Research participants from Neo mentioned that village leaders from Neo have tabooed part of their reef in the 1980s. In Graciosa Bay, most of the younger research participants mentioned that they have not seen the village leaders taboo their reef except for CMO2. He mentioned that traditional leaders from Nou and Uta have placed taboo on their reef once in the 1980s. The taboo covered the reefs between the sub-villages Nou and Mebealo. He expressed that over the last decade there was none throughout Graciosa Bay, except for Balo, Nepa and Pala. These villages still have strict traditional rules over their marine areas and resources. Being a traditional villager leader himself, CMO3 has taken up the responsibility over his settlement area, Nemu. During the time I conducted the interview with him (June 2002), he mentioned that he was currently placing taboo on the reef adjacent to Nemu (CMO3).

I was also told by AMY4 that the Province, through its Ordinance can also impose marine resources management measures in co-operation with the Fisheries Extension Officer at Lata. Such taboo applies to the entire Province and is expected to be followed at the village level. He recalls that once they placed taboo on turtles throughout the Province in the 1980s. The village leaders are often given the responsibility to monitor the villagers' compliance. AMY4 also mentioned that the Ministry of Fisheries and Marine Resources also impose management measures. Such management measures are applicable nationwide and were effected at village level. In most cases, due to lack of human resources from the Ministry, much of the monitoring responsibility is taken up by the village leaders. For example recently they have placed a bech-de-mer ban but it was lifted early this year.

7.4.3 Management measures and compliance level

The Province and the Ministry of Fisheries and Marine Resources are involved in the management of commercial marine species only. These include sea cucumbers, trochus, green snail and turtle. And the usual management measures used include bans on those marine species for a prescribed period, bans during spawning period, size limits, bans on the use of destructive fishing techniques and gear and bag size limits. Village taboo is not specific because it covers both commercial and non-commercial species on the nearshore reef. According to CMO2, this is an issue because he has placed taboo on the

reef but at the same time the Ministry has lifted the bech-de-mer ban. Consequently, those who collect sea cucumbers do not respect the taboo he placed on the reef.

Venga research participants commented that compliance with village level taboo, placed by the village leaders *“was generally good but there are always some deviants in the village. The number is low but has the potential to increase in the future”* (AMY4). They are often reprimanded by the village chiefs and in some cases they were fined. According to AFO3 those that have disobeyed, did it out of ignorance because they knew that they should comply, but instead they chose to break the taboo. Other factors which have also contributed to some people disobeying traditional taboo include people wanting marine resources for food and money. In Graciosa Bay, CMO2 mentioned that though he has placed the taboo, he sometimes sees villagers from the nearest sub-villages, coming and fishing within the reef boundaries he tabooed. He normally approaches some of them, but does not impose fines.

Compliance levels with the ban imposed by the Provincial government and the Ministry of Fisheries are often good because people fear being imprisoned. But two research participants from Venga and one from Neo mentioned that poaching during ban periods sometimes happens. According to them the reason is that the villagers wanted to accumulate the marine products so that when the ban is lifted and the market reopens, they would have enough already to sell. That means more marine products and more money for them.

7.4.4 Research participants perceptions about the abundance of marine resources

The fisher folks, who have been harvesting the marine resources for several generations, are well aware of changes in the ease with which they can catch fish. Therefore they infer there have been changes in abundance of the marine resources they depend for livelihoods purposes.

In Venga village, all the research participants mentioned that marine resources (both fin and non fin fisheries) have decreased. Three research participants from Venga village identified some marine species which they believed have been depleted or are now very hard to find. These include bur ke bo, bopri and derlve. A research participant, CMO1 also mentioned that one traditional fish called terlua, that has a cultural significance to their village, is no longer fished because they have disappeared. He thought that their usual fishing ground was destroyed by a previous logging company (Allardyce Logging Company) which operated on the other side of Graciosa Bay.

When asked how do they know or realise that marine resource have decreased various answers were given. I have preferred to refer to them as indicators because they have indicated to the villages that a particular marine resources have decreased, or depleted.

Indicators
1) Difficulty in catching fish
2) It takes longer time to catch many fish
3) Tough it takes longer time to fish, small sized fish were caught
4) To catch more fish, fishing has to covered larger area
5) Traditional fishing ground on the shore are no longer rich as before
6) Difficulty in finding shells <ul style="list-style-type: none"> - Shells living on rocks on the shore - Clam shells - Trochus - Green snail - ler (kind of edible shell) - nibuper (kind of edible shell)
7) Longer time to find many shells
8) Mostly like to catch smaller fish and find smaller shells
9) Having to go further out into the reef or deeper waters to catch fish
10) Realization of certain marine species are now lacking
11) Use of modern techniques and gear. It is a sign of trying to keep up with marine resource scarcity
12) Losing interest in fishing in nearshore fishing and also in some fishing techniques
13) Commercial species difficult to find <ul style="list-style-type: none"> - one-two if dive during the day without use of rocket - diving in the night using flash lights
14) People anticipating further coastal marine resources decrease

Table 13: Indicators showing decrease in marine resources

When asked what factors have caused their marine resources to decrease, research participants have given different factors (Table 14). A brief description of factors contributing to decrease in marine resources is appended in Appendix 7.

Factors	Venga		G/Bay		Neo		Where the factor is more emphasised
	N = nearshore; O = offshore						
	N	O	N	O	N	O	
1) Institutional changes: – Less respect for Letaluas	x		x		x		V, G, N
2) Population increase	x	x	x	x	x	x	G
3) Resettlement	x		x		x		V, G, N
4) Need of money to meet changing cultural obligations	x	x	x	x	x	x	V, G, N
5) Market influence	x	x	x	x	x	x	V, G, N
6) Cyclones, sea level rise	x				x		V, N
7) Increase in number of fishermen	x	x	x	x	x	x	V, N
8) Fishing techniques	x	x	x	x	x	x	V, G, N
9) Frequent fishing	x	x	x	x	x	x	V, N
10) Women's increasing involvement in fishing	x						V
11) Ignorance of boundary within village	x		x		x		V, G, N
12) Disobedience and Ignorance	x		x		x		V, G, N
13) Rubbish disposal	x		x		x		V, G, N
14) Bleach run off			x				G
15) Run-off from logging		x		x			G

Table 14: Factors affecting near and offshore marine resources by village

While some of the factors are more frequently encountered in one or two villages, they are also evident in the other village(s). For example, according to some fishermen from Venga village the pollutants (oil run-off) from the logging company in Graciosa Bay also affected their offshore fishing grounds (oily sea surface). Another example is increased population. Population implications is more emphasised in Graciosa Bay, but apparently it is also a factor that is affecting marine resources in the other two villages too.

Some of the factors listed above are anticipated to increase in the near future with more implications on marine resources and their management. As CFO3 said, “As the village population continues to increase the current marine resources we have now will further be affected”. There are also some speculations that additional factors will later become evident in the future, but time will tell (key informants). As AMY2 said, “we are not certain of what is going to happen in the future, given the fact that the village population is increasing and the dependence on marine resources for food and

income is also increases.” The future of the current logging operation on the other side of Graciosa Bay is also causing some uncertainties about marine resources.

7.5 Chapter summary

Fishing in the contemporary context exploits a wide range of marine resources for consumption and commercial purposes. Commercial purposes have increased considerably in the three case study villages. Nearshore fishing exploits a wide range of marine species. Sea cucumbers and trochus are two commercial species commonly harvested. Offshore fishing is now common and an important income source for most fishermen in the three villages. Modern fishing techniques and gear are mainly used by the research participants. This is due to the notion that traditional fishing gear and techniques are no longer suitable because the status of marine resource have changed. Women’s involvement in fishing has increased over the past years. Specifically they are now practicing men’s fishing techniques and using some fishing gears that are often used by men.

The management of marine resources has taken on different approach. Marine boundaries and rights are no longer as effective as before. The traditional village leaders and the modern village chiefs now work together to manage the marine resources. The Provincial and the national Government through the Ministry of Fisheries and marine Resource also play a role in the management of marine resources at the village level. They manage the commercial marine species found in the villagers marine areas. The village leaders manage all the marine resources both commercial and subsistence. Over that last decade, placing taboo on the reef by the village Letalua and chiefs is not common in the three villages. Different management measures were imposed and the compliance level varies between the village level taboo and Government taboo.

Marine resources in the three case study villages have decreased. The research participants have identified various indicators to indicate the decrease. They have pointed out many social, environmental, economic, institutional, cultural factors which they think have contributed to the current status of their marine resources.

The next Chapter discusses the nature of the relationships and interactions between livelihoods and marine resource management under CMT arrangements.

Chapter 8: The Nature of the Relationships and Interactions Between Livelihoods and Customary Marine Resource Management: A Discussion

8.1 Introduction

This chapter discusses the nature of the relationship and interactions between livelihoods and customary marine resource management under CMT. The discussion is based on the research questions, research findings and literature reviewed in the previous chapters. As much as possible, the discussion ties threads to the literature reviewed in Chapter 4.

The state of the villagers' livelihoods and customary marine resource management under customary marine tenure are presented in section 8.2. This section also presents the principle elements of customary marine resource management in the three case study villages and the factors affecting it. Following this, the influences of changes in the villagers' livelihoods on customary marine resource management and vice versa are discussed. The last section provides a description of the interaction between livelihoods and customary marine resource management. The chapter is then concluded with a summary.

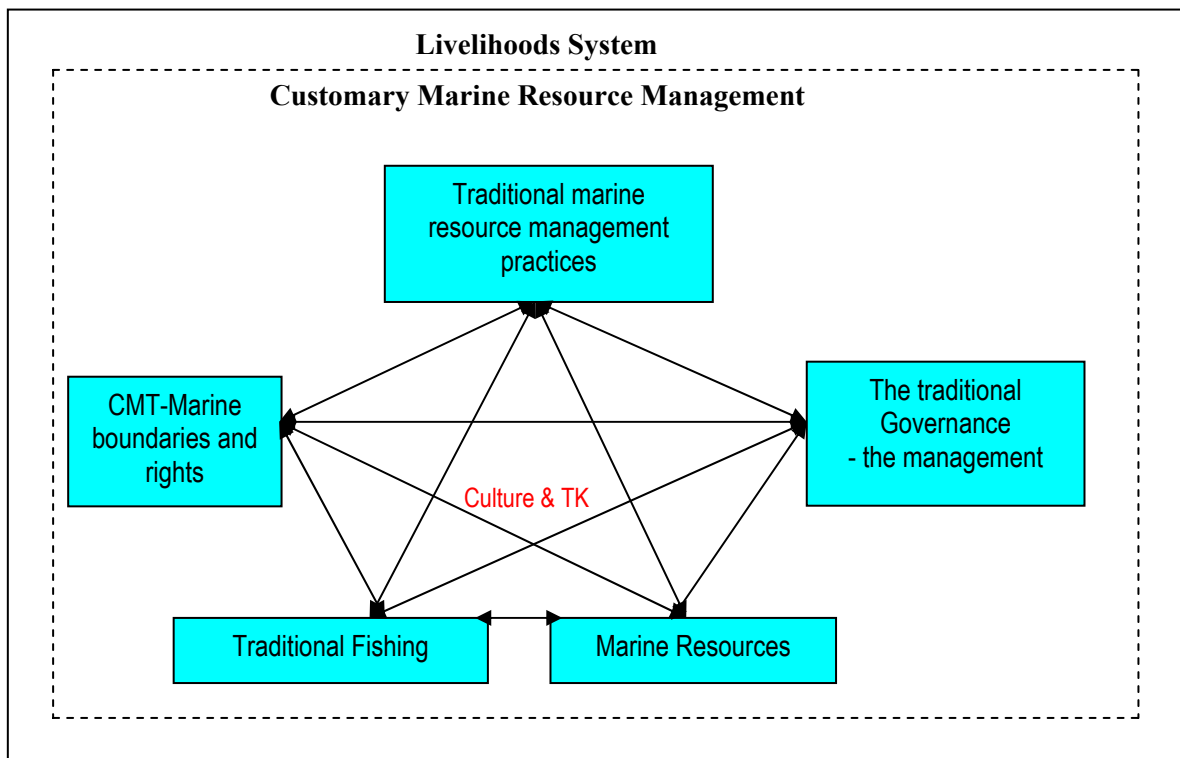
8.2 Livelihood systems and customary marine resource management

As shown in Chapters six and seven, the components of the villagers' livelihoods system have changed over the last decade. These components, as contained in the DFID (1999) Sustainable Livelihoods Framework, include livelihood assets (natural, physical, human, financial, cultural and social), livelihood strategies, livelihood outcomes, and the vulnerability context.

Likewise, customary marine resource management in the three case study villages has also changed. Overall such management is now considered by the research participants as ineffective in managing marine resources. Various factors have influenced the customary marine resource management in the three case study villages. These factors include colonialism and neo-colonialism, breakdown of the traditional leadership system, changing aspects of customary marine tenure, influence of Christianity, economic development, introduction and expansion of new commercial marine product markets, use of modern fishing gear, demographic changes (increases in population), settlement patterns, modern education, and declining traditional social and cultural capital.

There are no set rules that govern the customary marine resource management under customary marine tenure in the three villages. This is consistent with Hickey (n.d) and McKinnon's (1993) findings. This study, however, has revealed that customary marine resource management in the three villages is inseparable from these principle elements: customary marine tenure which covers customary marine boundaries, rights and the traditional governance (the management); customary

marine resource management practices (traditional knowledge, beliefs, taboos, seasonal closures, gender involvement in fishing) and traditional fishing (techniques and gear). These principle elements of customary marine tenure are part of the villagers' livelihoods system as shown in figure 14 below. These elements are rooted in the villagers' culture.



Key: TK = Traditional Knowledge

Figure 14: Livelihoods, customary marine resource management, and the principle elements

The factors affecting customary marine resource management are directly or indirectly mediated through the principle elements of customary marine resource management. In other words, the changes in the principle elements have affected the traditional functioning of customary marine resource management that used to exist in the three villages. Past research on customary marine resource management by, among others, Aswani (1999), have treated these principle elements and the factors that affect customary marine resource management separately from the villagers' livelihoods. This study, however, argues that both customary marine resource management and the factors affecting it should be viewed within the context of the villagers' livelihood system. This is because they are part of the villagers' livelihoods system. Moreover, the components of villagers' livelihoods systems are interrelated (DFID 1999).

8.3 Livelihood changes: Insights to influence on customary marine resource management

This section provides discussion and insights on how the changes in the villagers' livelihoods components affect customary marine resource management under CMT. The key elements and the factors affecting customary marine resource management are discussed in relation to the different components of the villagers' livelihoods system. The components of the Sustainable Livelihoods Framework are used to structure the discussion in order to identify the nature of the relationships between livelihoods and customary marine resource management under CMT.

8.3.1 *The villagers' livelihood assets*

According to Ellis (2000), assets are the cornerstone to understanding the options available to the poor, the strategies they adopt to attain livelihoods, the outcomes they aspire to and the vulnerability context under which they operate. The kinds of assets owned and accessed by the villagers are now discussed in relation to how they influence customary marine resource management in the three case study villages.

Natural assets

Natural resources owned and accessible to the villagers in the three case study villages remain the major source of food and income for the people in the three case study villages. These include land and sea resources. Many past researchers (e.g. Aswani 1999) have not acknowledged the changes in land resources when trying to explain the factors affecting customary marine resource management. This study argues that land resources are an ultimate alternative to marine resources in the three villages. There is a close relationship between land and sea resources in the livelihoods of the villagers. This means that any changes in either of them can affect the state and the rate of dependence on the other. For example, it is evident in the three case study villages that changes in land availability and pressing land issues such as land shortages to grow commercial agricultural crops such as coconut, cocoa, or engage in forestry, has also caused some villagers to use marine resources to earn income. In addition, the unattractive and unstable agricultural markets have caused more villagers to opt for attractive marine-based income generating resources such as fish, bech-de-mer, trochus, and shark fin. This has contributed to the decrease in marine resources and overexploitation due to a high rate of dependence. In turn the decrease in marine resources has caused fisher folks to change their fishing techniques and gear to ensure a successful catch.

In terms of food (i.e. protein), the depletion of land-based sources of protein has caused heavy dependence on edible marine resources. In retrospect, there seemed to be a balanced dependence on the two natural resources for protein but since traditional land-based sources of protein has decreased and the cattle and poultry farming is not common, the dependence is skewed towards marine resources.

In the past, almost all kinds of nearshore and offshore marine species found in one village can be found in the other two villages. However, the levels of the different marine resources at the disposal of the three villages varied greatly, as shown by the indicators identified by the villagers. The indicators include the levels of marine resources, lack of some traditionally fished marine species, accessibility to marine resources, longer time to catch or find marine species, size of areas covered to find or catch enough marine resources, size of marine species and decreasing interest in fishing by some villagers. The kinds of marine resources that have decreased in the three case study villages vary. For example, sea cucumbers are found in higher numbers in Venga than in the other two villages. The reason being that the factors affecting the respective villages' marine resources also vary in magnitude and number. The decrease in marine resources has had implications on customary marine resources management as well.

There are various factors that affect marine resources in the three villages. They include breakdown of traditional leadership systems, increasing population, overfishing, resettlement, increasing need for money to meet changing cultural obligations, expansion and introduction of new marine product markets, increase in the number of fishermen, women's involvement in fishing, use of modern fishing gear and techniques, frequency of fishing, ignorance of boundaries between village, changing attitudes towards marine resource management, rubbish disposal, changes in land resources and changes in market prices between land and sea resources. Although most of these factors are evident in the three villages some are more prevalent in one or two village(s).

Physical assets

There are two types of physical assets, namely, infrastructure and producer goods (DFID 1999, Cahn 2006). These two physical assets are crucially important for livelihoods (DFID 1999). The study revealed a trend whereby villagers are increasingly aspiring to increase or enhance their physical assets. Their physical assets are now basically modern. They utilise their livelihood resources and engage in livelihood strategies that earn them income to buy what they need and want. For example, owning a village trade store and acquiring better modern fishing gear and techniques is one of the aspirations some of the villages have. Having better clothes and owning improved kitchenware is some of the things that some females aspire to achieve. Moreover, the fact that some essential infrastructure is lacking in the villages has also influenced the way people use their marine resources. For example, in Venga village and Neo proper, water supply is lacking. For this reason some families aspire to have their own water tanks. They resort to available resources they have, such as marine resources, to generate income to cater for these needs.

Marine resources which are regarded as a significant avenue for income generation through fishing are now harvested at an unsustainable rate. The aspirations of villagers enhance and increase their

physical assets has significant implications on fishing and marine resource status, including land resources.

Financial assets

Since the introduction of modern money during the colonial and the current post independence periods, feather money has almost disappeared in the three villages. Almost all the cultural functions of feather money have also diminished, even though now it has tourism significance. Modern money has taken the place of feather money and is increasingly important to the villagers as their village economy continues to integrate into the modern and advancing economy. The financial assets refer to cash at hand, cash savings and investments (Cahn 2006). The need for money to enable them to finance what they want from the shop and settle their changing cultural obligations has caused more and more villagers to venture into income generating activities. Not only is the need for money increasing, but the need for cash savings is also increasing as well. The villagers need to save in order to finance their family future needs such as school fees, unexpected family circumstances and other cultural obligations. The villagers not only need money to meet their own needs but also to meet their extended and wider community's needs or requirements. For example, they make contributions to the church, the school and other village groups. Some of the research participants testified that they engage in fishing because it is an "easy and quick" means of earning income to meet these needs.

The disappearance of feather money in the village economy has partially disrupted the cultural significance of how traditional fishing was done. For example, the use of traditional money used to be associated with the specialised nature of fishing and trade between villages. But the advent of modern money, which can now be earned by anybody, has disrupted the specialised nature of fishing. Fishing is no longer specialised. Moreover, trading between villages has stopped as the villagers have begun to divert their focus to modern markets within the cash economy.

Earning income was traditionally men's domain. As mentioned above, women are now increasingly engaging in fishing activities to generate income. Most of the women who engage in fishing to generate income are widows, single mothers, young females and those whose husbands do not actively engage in fishing. This trend indicates the breakdown of one of the important cultural purpose of fishing, the art of sharing. Women's ignorance of cultural aspects of fishing couple with the declining influence of traditional village leaders has also contributed to an increasing number of women engaging in the fishing. The increasing engagement of women in fishing obviously also has implications on customary marine resource management.

Human assets

Each individual, their knowledge and labour is regarded as important for the peoples' livelihood (Cahn 2006, Iglis 1993). There are three important aspects of human assets that affect customary marine

resource management. First, the physical features of the human population of the three case study villages. This includes the population sizes and settlement patterns. The population in the three case study villages have increased over the years. The increasing populations have led to a high dependence on marine resources and overfishing. Decrease in nearshore marine resources due to population increases is evident in the three case study villages, although this is more apparent and profound in Graciosa Bay than in Venga and Neo villages. This is due to high rate of use of marine resources, rubbish disposal and the activities of the past and present neighbouring logging companies in Graciosa Bay.

The second aspect of human asset refers to the increasing number of village children attending schools and the need for money to finance school fees. In the past, there was less school attendants and those that have attended were mostly males. Due to the recent Education Policy coupled with the realisation of the importance of education, more village children (both male and female), are now attending schools. This trend is expected to increase in the future. Sending children to school is influenced by the fact that access to and availability of natural resources is diminishing due to internal and external forces affecting the villages. For example, some of the research participants send their children to school because they believe that in future there will be a shortage of land and their children's education is their security. Therefore, meeting cost of education is one of the main reasons why village fisher folks engage in fishing.

The wealth of traditional knowledge possessed by the villagers is the third aspect of human asset. This study found that traditional knowledge used to play a much more important role in customary marine resource management in the three villages. Apparently the traditional knowledge relating to customary management of marine resources continues to fade with dying older generations. Most of the younger generations in the villages are not enthusiastic to learn the traditional knowledge from the older people. Modern education and urbanisation are the two factors that some of the older village research participants have identified that are responsible for this trend. As more and more villagers attend schools and the process of urbanisation increases, there is a real potential that the traditional knowledge, which is one of the fundamental elements of customary marine resource management practices, will be profoundly eroded. But its availability and importance has diminished in recent decades. Odero (n.d) has argued that information is another capital that is crucial for livelihoods purposes. Much of this information is disappearing with the dying older generations.

Cultural assets

Over the past decade, many aspects of the villager's culture have changed. This is very critical because many aspects of customary marine resource management are rooted in the villager's culture and traditional beliefs. Changes in the villagers' culture have influenced the way customary marine resource management is undertaken in the three villages. In terms of fishing, a lot of the ways villagers

carried out their fishing activities in the past have changed. Fishing was and is considered a cultural activity in the three villages. However, what differentiates traditional fishing in the past from contemporary context is that fishing had a lot to do with the villagers' culture and the way marine resources were managed. Here, fishing techniques and gear, gender involvement in fishing, and changing cultural reasons and values of fishing are discussed.

Traditionally villagers utilised traditional fishing gear and techniques because they had a cultural significance. This had direct implications on customary marine resource management in the past. There are two main reasons for this. First, the types of traditional fishing gear and techniques employed were traditional and consequently had insignificant impacts on the state of marine resources. It was evident from the fieldwork that modern fishing gear and techniques are now commonly used. These fishing gear and techniques are considered not environmentally sound by the interviewees. They pointed out that depletion of marine resources and cause fin fish to become frightened and wary.

Second, in the past the specialised nature of most traditional fishing gear and techniques limited the number of fishermen who engaged in fishing. Commonly used communal fishing techniques conformed to the customary management practices. Nowadays, fishing gear and techniques are no longer specialised. Fishing gear, for example, is readily available in shops. Access to fishing gear is no longer a limitation factor to engage in fishing. In addition, knowledge about fishing techniques is no longer confidential and the specialised nature and the importance of past fishing techniques have diminished. As a result more and more villagers continue to engage in both subsistence and small-scale fishing activities. The concurrent loss of compliance with customary management practices has meant that impacts on the state of nearshore fisheries have increased.

Moreover, specialised traditional fishing gear and techniques traditionally served as a cultural identity of a particular clan or family that practised them in the past. For example, a particular family in Venga village specialised in building outrigger. In Neo village, some fishermen specialised in shark trapping. In Graciousa Bay villagers residing in the northern part of the village are known for their engagement in traditional fishing while those residing in the Southern part were traditionally famed for producing traditional fishing nets. Unfortunately, because the specialised nature of fishing has diminished, fishing has become a common activity to any villager. Consequently, the cultural identity of specialised traditional fishing activities attached to the traditional practitioners has diminished.

The cultural features of gender involvement in fishing have also played a major role in customary marine resource management in the past. Fishing was traditionally men's activity though women and children engaged in reef gleaning activities. The fact that women were less involved in fishing in the past meant the impact of the women's engagement in fishing on marine resources was less significant. Fishermen were able to balance their fishing patterns throughout the year to ensure marine resources

recovered. For example, engaging in offshore fishing is one of the ways whereby traditional fishers allowed the nearshore fishery to recover. Today, increasing women's engagement in fishing does not allow for this traditional practice to continue. The pressure on nearshore and offshore marine resources is now the same as both are no longer harvested at alternate times as was that case in the past.

The traditional diets of the villagers have also changed. In the past the diet was more traditional but now they desire store food and more marine food such as fish and shells. Fish consumption is more frequent in Venga and Neo village than in Graciosa Bay, although generally increasing in the three case study villages. Fish consumption is more frequent in Venga and Neo because access to fish is much easier than in Graciosa Bay. Moreover, consumption of marine products is high because there is limited and cheaper alternative sources of protein for the villagers. The changing diet of the villagers has caused more fishing activities to take place. The small-scale fishers take advantage of this situation by selling their catch to the villagers. The increasing intake of store food means that they have to acquire money to purchase it. Fishing is one of the main sources of income that most villagers resort to. The cravings for marine food for household consumption and market are high. Apparently, there is not much alternate source of protein for the villagers so edible marine resources have become the only major source.

Sharing catch for free with extended family members and village elders was a predominant cultural practice in the past. There has been a significant shift from this traditional practise due to the increasing need for money and the introduction of commercial value of some marine species. The gradual shift from extended family to nuclear family has also contributed to the diminishing value of cultural sharing compared to the past. Consequently, purchase of fish is now common. Given this trend, it is likely that subsistence fishing will continue to be in transition into small-scale commercial fishing activities in the future.

Aswani (1999) and Crean (1999) pointed out that under the customary marine tenure entitlements to marine area does not only apply to geographical location but also to specific habitats, technologies, and species or a combination of these. The three case study villages shared similar attributes. Traditional fishing was highly specialised. Specifically, most of the traditional fishing techniques and gear were specialised, although some were communal. Moreover fishing was done during certain times only. However, there has been a shift from this past practices. Nowadays any fisher folk can fish anywhere for any kind of marine species, using the technologies he/she owns and have access to, although restrictions on non-villagers fishing in traditional areas remain.

Social assets

Traditionally social capital was a useful and important aspect of marine resources management. The manner in which social capital may influence societal performance, including marine resource

management can be divided into three categories: trust and trustworthiness, civic engagement and cooperation, and social networks (Paldam 2000, Grafton 2005). The social assets of the villagers have changed over the past years.

According to Grafton (2005), the role that trust contributed to marine resource management can be viewed in two categories: trust between fisher folks and trust between fisher folks and managers. The study, however, has revealed that traditionally, trust was not an issue as there were abundant marine resources in the three case study villages. More importantly, all the traditional management practices were embedded in the villager's culture which each villager was expected to follow. Individual did not necessarily have to trust each other to comply with the management practices, but rather was required by their culture. Each individual was culturally expected to perform up to what their culture required them to do in terms of carrying out fishing activities and performing the traditional marine resource management practices. Perhaps it was not until the advent of economic importance of some marine resources, during a period when customary marine resources management has eroded that trust has become crucially important for an effective management regime.

The other category of trust is the trust between fisher folks and the traditional leaders who make decisions about marine resource management. According to Grafton (2005), this kind of trust is important for information exchange between the managers to the fisher folks. In the context of the case study villages, traditional knowledge traditionally important for marine resource management was always transmitted from generation to generation. Consequently, in the past every fisher folk knew about traditional fishing and the traditional management practices. The wealth of knowledge possessed by the present generations has decreased, implying a lower level of relationship between traditional leaders and fisher folks. Apparently, there are no effective linkages between fisher folks, the Provincial Fisheries Extension Office and the Ministry of Fisheries and Marine Resources to built trust. While the Provincial Fisheries Officer sometimes visits Neo fisher folks, he rarely visits those in Venga and Graciousa Bay.

Cooperation between fisher folks is a necessary element but not sufficient for effective management of marine resources (Ostrom 1994 et al, Jentoft et al 1998). In the past, there was a very good level of cooperation between the fisher folk and the traditional village leaders. The level of compliance towards what the traditional village leaders said regarding taboos was better than now. The older research participants have pointed out that there is a need for cooperation with modern village leaders of the three case study villages. The reason being younger generations often do not comply fully to the older villager's advice on how fishing should be carried out to ensure traditional management practises were maintained and marine resources sustainably managed.

Social networks between the individual fisher folks, families and village leaders are also important in customary marine resource management under CMT. It determines the outcome of the social capital and is important to ensure trust and effective cooperation for an effective management. There can be bonding social capital, bridging and linking social capital (Narayan 1999, Putnam 2000, Woolcock 2001). How these relate to the three case study villages shows a divergence to how they used to be in the past. Bonding social capital which occurs between like-minded group(s) plays an important role in traditional marine resource management. While bonding capital is specifically necessary for management purposes, the village fishermen cooperate in the hope to enhance the benefits they could get from fishing. For example, in Neo village the villagers are in the process of forming an “association” that could help them maximise benefits. The fishermen in the three case study villages also share information relating to fishing gear and techniques that they use. In Venga and Neo village, offshore fishermen often teach inexperienced fishermen in an attempt to enable them to engage in fishing and earn money for their own families.

The effectiveness of cooperation between village leaders to impose management measures such as taboo varies between the villages. For example, in Venga village, the village leaders have placed two taboos in recent decades, while one taboo each has been placed in Neo and Graciosa Bay (but only in Nemu area). This implies that village leaders now prioritise other agendas other than marine resource management. Although decrease in marine resources have been recognised in the three case study villages, taboos are not common.

The villagers were traditionally part of the social network that exists between individuals, families and villages. The relationship between them serves as a catalyst to ensure trust for mutual benefit. In addition, the level of cooperation and trust is high between them and it ensures good management for mutual benefits for the villagers, and no cost for management.

8.3.2 Policies, structures, and processes

Customary marine tenure is part of the Sustainable Livelihoods Framework component. It comes under the “institutional structures and processes” component of it. Customary marine tenure still exists in the three villages and is recognised by law, but it has undergone some changes, specifically in terms of marine boundaries and rights and management.

Marine boundaries

Marine boundaries were and are still observed in the three case study villages, but have undergone changes. Nearshore marine boundaries are still demarcated with landmarks and feature such as mountain tops. They are still used as reference points for locating offshore reefs in the three case study villages. Researchers seem to focus on boundaries between villages (Asafu 2005), but the three case

study villages revealed two categories of marine boundaries: the boundaries between villages and boundaries between sub-villages within the villages.

Boundaries between villages are still observed in many ways and the village as an identified and unified entity still remains. On the other hand, boundaries between sub-villages are no longer as strict as before because the influence of the sub-village leaders in the management of marine resources is no longer as influential as before. In addition, villagers now ignore the traditional practice that villagers from each sub-village should not fish in any other reef apart from theirs. This is due to two reasons. First, the decreasing marine resources have caused fisher folks to fish beyond their sub-village boundaries. Second, it seems that with the recent advent of commercialised marine resources and increasing commercial markets for marine products villagers tend to harvest commercial marine resources beyond their boundaries. It is important to note, that this trend may not continue in the future if the adjacent land owners wish to exclude outsiders.

This study also supports that view that marine boundaries were initially disrupted by colonialism and the modern system of government (Townsend et al. 2001). For example, some parts of the villages have been acquired by the Government for development purposes and resettlement. Sale of customary land to outsiders by landowners in the villages is also impacting on marine boundaries and rights in the three villages.

Marine rights

While under customary marine tenure reefs have been seen as extensions of land (Hickey 1998, 2006) and marine rights as in the hands of the individuals, tribes, clans or villages that own the adjacent land (Hickey and Johannes 2002), this study reveals some differences. Marine rights are in the hands of the villagers. Primary, secondary and usufruct marine rights (Aswani 2005) are also evident in the three case study villages.

However, there are variations in terms of rights to nearshore and offshore reefs. In terms of nearshore reefs the land adjacent to the reef is owned by the adjacent land owner but traditionally all the villagers have the same user rights as the land owner over these areas. With the ascribing of modern monetary value of marine resources, it is likely that in the future land owners will attempt to restrict their reefs, from non-land owners. The villagers who became part of the village by marriage and residence have secondary rights. While usufruct rights used to be common in the past in the three case study villages, it is no longer common. This is due to the increasing realisation of the economic importance and value of marine resources by the villagers and the opportunity cost of transferring marine rights. On the other hand, offshore reefs are owned by all the villagers in respective villages. Traditionally only primary right holders engage in offshore fishing but now secondary right holders also fish offshore with the company of primary right holders.

Excludability is one of the main features of customary marine tenure (Aswani 2005). Ensuring sufficient marine resources were available to rights holders was the traditional rationale for excluding outsiders in the past. Excluding outsiders due to economic reasons is now an additional reason. This is mainly due to the increasing realisation of economic importance of marine resources in the three villages. Invitation was common in the past but only within the village, and permission is often sought from the villager leaders. Now invitation from another village is evident but often without permission from the village leaders. This is an indication of declining social network between the leaders and fisher folks in matters concerning marine resources and its management.

Management decisions and responsibilities: village level

Aswani (1999) and Hickey (1998, 2006) pointed out that the management of marine areas under CMT is generally, *but not always*, the responsibility of the adjacent land custodian. In the case study villages, the land is owned by a particular tribe but the management was in the hands of the village leaders. The village leaders constitute the different sub-village leaders of the villages.

Traditionally, the leadership governance system was enclosed and stable. That is, it was not influenced by any Western influence and therefore the system worked well to administer management of marine resources smoothly. In the past decisions and responsibilities of the village leaders over marine resource management was decentralised amongst different traditional leaders in the sub-villages within the three case study villages. Although traditionally decentralised, there used to be a very effective and efficient level of cooperation and social network between the traditional village leaders concerning marine resource management.

With the introduction of the modern system of Government, the responsibilities and influence of traditional leaders in customary marine resource management began to decrease. For example, the Fisheries Act (1998) states that small-scale fisheries are to be managed by the Government. Although their influence was disrupted, in the 1980s, traditional village leaders were still able to make joint decisions concerning management of marine resources. In the last decade, the increasing changes in village culture due to modernisation, has further amplified the situation. The implications of these are as follows.

The village leadership now tends to be more centralised in the hands of the village leaders, who now see the village as one entity and not sub-villages when dealing with matters concerning marine resource management. Apparently, the three villages show different village leadership structures. For example, in Venga, they have a village council of chiefs who are elected by the villagers. In Neo and Graciosa Bay have their own informal way to selecting their leaders. These differences in village leadership structures have contributed to different ways in which marine resources are managed in the three villages. Effective cooperation between traditional leaders and modern leaders is necessary for

better management but apparently needs improvement in all three villages. The contemporary village leadership structure seems to work differently in Venga village and Neo but is more dispersed in Graciosa Bay perhaps due to ad hoc nature of the structure and scattered nature of the village.

Above the village management is the relevant authorities of the Provincial and National Government. Traditionally, marine resources were managed by the traditional village leaders. To foster the country's economic development the Government introduced markets for some marine species. These are commonly referred to as the commercial species which are targeted by small-scale fishing activities. The management of these small-scale fisheries is handled by the Government as stipulated in the National Fisheries Act 1998. Taking this responsibility away from the traditional leaders reduced the influence they had over marine resources that the villagers owned. However, because the Government lacks the capacity to enforce management measures, most of the responsibilities are largely in the hands of the village leaders. The extent to which the village leaders successfully take up this responsibility largely depends on the nature of the villagers' social assets. Specifically, it depends on the level of trust, cooperation and social networks between the fisher folks and the village leaders.

In terms of management measures at the village level, the leaders can also impose management measures. Unfortunately, the traditional management measures are no longer effective due to cultural changes as a result of modernisation. This is important because when these changes began to happen in the 1980s, traditional village leaders tried to stop them but to the villagers it seemed that fishing was all about making a living in this modern age. Although, taboos still exist, in the last decade none there were done in the villages except for the taboos imposed by the Nemu village leader during the time of research. However, the taboo was done at a time when the Government lifted a ban on bech-de-mer throughout the Solomon Islands. If there had been effective communication with the Government's Fisheries representatives at the Provincial level, this would have not happened. At the provincial level, the provincial government under its Ordinance can also impose a ban on commercial marine species which is implemented throughout the Province. At the National level the Ministry of Fisheries and Marine Resources can impose bans which are implemented throughout the country.

The compliance level of traditional management measures was exceptionally good in the past. This is due to the fact that such measures were basically part of the people's culture or way of life. In addition, the traditional leaders were very influential and the level of adherence rendered to them by the villagers was very high. As the villager's culture changed and the traditional leadership changed, compliance levels began to decline. It appears that villagers fear more bans Provincial Government and the Ministry of Fisheries and Marine Resources because they associate such bans with severe penalties which may include imprisonment. However, it should be noted that the compliance level with Government bans is often not satisfactory. Enforcement of the government imposed bans tends to be voluntary at the village level. There is not incentive, such as formal links with the government, for

the village leaders to effectively ensure compliance at the village level. These have resulted in some villages breaching some of the bans, and getting away with it.

8.3.3 Livelihood strategies

Ellis (1998) pointed out that families in developing countries base their livelihoods around complex livelihood strategies that provide means of survival and living. He asserts that individuals and families seek to maximize the use of the bundle of resources available to them. It appears that in the three case study villages, villagers have a wide range of livelihood strategies, making the most of the resources they own and have access to. The kinds of livelihood strategies that the villagers engage can be categorised into two categories: natural resource-based and non-natural resource-based. In addition, the choice of the livelihood strategies they engage in is dependent on what kind of livelihood outcome they aspire to achieve from engaging in it.

Land and marine resources serve as the two sources of the natural resource-based livelihood strategies the villagers engaged in. Evidently, the villagers depend on both natural resources to make a living to a greater extent. What constitutes “their dependence” could be a potential area for further research. However, what is clear is that the villagers depend on land and marine resources both for consumption and income. While both resources are exploited for consumption purposes, increasingly village fisher folks perceive marine resources as an attractive natural resource for generating income compared to land resources. The reason being that agricultural-based income generating activities such as copra, cocoa and other productions are not commercially attractive. There is inefficient transportation to buyers in Honiara and they involve a lot of labour and time. The younger male research participants, and a few females, engage in small-scale fisheries to generate income. Most female research participants generate income from the sale of raw fish, fish and chips, and fish and pudding. The fisher folk’s dependence on marine resources for income purposes is likely to increase in the future if naturally-based income generating activities become unattractive. Moreover, the dependence on marine resources for consumption will also increase as there are limited cheaper alternative protein sources for the villagers.

Fishing has provided employment for most of the research participants, particularly, for those who engage in small-scale fishing. The full time fishers adjust their fishing techniques and gear throughout the year to ensure high fishing efforts during low seasons as well. This kind of fisher is likely to increase as the need for money increases in the three villages. In part-time fishing, fishers move in and out of fishing to generate income. When they are out of fishing they make use of the opportunities available to them in land-based and non-natural resource-based income generating activities.

8.3.4 The villagers' livelihood outcomes

DFID (n.d.) points out that livelihood outcomes are important because they influence the way people behave as they do and how they respond to new opportunities. In the past food security and income were the main livelihood outcomes in the three case study villages. Other things they have aspired to achieve include sustainable resource use and maintenance of acceptable level of marine resources, peace, respect, unity and cultural survival.

In the past, the villagers engaged in fishing in order to produce protein and earn money. Traditional fishing was also the basis of their cultural identity. Moreover, the customary marine resources management traditionally ensured that there was sustainable marine resource use. Food security, money and sustainable use of marine resources are still the livelihood aspirations of the villagers. However, the manner in which villagers in the three case study villages prioritise the different livelihood outcomes differs. For example, in the past, it appears that food security, income and sustainable management were evenly prioritised in the three case study villages. Nowadays the need for income tends to dominate livelihood aspirations of the villagers and to sustain their lives. Sustainable management of their marine resources is a need but not a priority as the need for money increases in the cash village economy. Consequently, there is a tension between aspiring to attain sustainable marine resource management, food security (protein) and monetary gain.

The changes in the villagers' livelihoods outcomes have had impact on the marine resources, fishing and customary marine tenure.

8.3.5 The villagers' livelihoods vulnerability context

The villagers' livelihoods are vulnerable to internal and external factors. To withstand these factors the villagers often engage in adaptive strategies. This section discusses the vulnerability context of the villager's livelihoods in relation to customary marine resource management under CMT. The relatedness of the villager's livelihoods and customary resource management is also discussed.

According to DFID (1999), the vulnerability context determines the external environment in which the people operate. The people's vulnerability context can be viewed from three dimensions. They are through the trends, shocks and seasonality. These directly affect the livelihoods assets of the people and their livelihoods options. When relating the trends, shocks and seasonality to the vulnerability context of customary marine management in the three case study villages, most of the factors pointed out by the villagers are more related to trends than shocks and seasonality.

It is evident that the traditional livelihoods of the villagers are vulnerable to many factors. These include things that do not conform to the villager's culture, the modern system of education, and natural disasters. These factors have increasingly intensified over the recent years as the villager's

culture continues to change. The villager's culture is continuously influenced by factors that are internal and external to the villages. Modern education, as mentioned above has increased over the years as well. The frequency of natural disasters such as cyclones has increased.

The changes in the villager's livelihood assets, strategies, outcomes, and policies, institutions, structures and processes also impacted on customary marine resource management. For example, the changes in the status of marine resources the villagers owned and have access to have also contributed to the degradation of customary marine resource management. In any case the villagers resort to adaptive strategies to counteract and withstand their shocks. An example is the use of modern fishing gear and techniques. One of the reasons why village fisher folks began to use modern fishing gear and techniques is because the status of the gear has changed. Modern fishing gear is more effective in fishing efforts than traditional gear.

8.4 Influence of the changes in customary marine tenure on livelihoods

The relationship between customary marine resource management is two-way. The initial changes in customary marine tenure over the past years also affected the other components of the villager's livelihoods. The changes in customary marine tenure affects the livelihoods of the villagers through the changes in the status of marine resources, fishing, customary marine boundaries and rights, changes in village management authorities and management practises. This is because these are part and partial elements of customary marine resource management under customary marine tenure.

Changes in marine resources and fishing

As mentioned above, the breakdown of customary marine resource management has affected the status or the level of marine resources. This is a view commonly shared by various authors such as Aswani (1999, 2005), Foale and Manele (2003), Fairfax (2006), among others. However, it is evident from the study that the changes in the status of marine resources over time have also caused traditional fishing techniques and gears to change. Specifically, the research participants pointed out that as marine resources changes, fishers also adjust their fishing techniques and gear. Fisher folks resort to modern fishing techniques and gear as they claim that modern versions are more effective than traditional ones.

Changes in customary marine boundaries and rights

Fixed customary marine boundaries is one of the consequences of changes in customary marine management brought about by the modern system of government. This has affected the traditional social networks that existed between the villagers in the past.

Changes in traditional management practices

The changes in the traditional management practices under the CMT have also caused fisher folk's marine resources to decline. In addition, as the marine customary marine resource management practices erode, the traditional knowledge about them also erodes. Modern education and urbanisation were the two factors frequently mentioned by most of the older research participants that have contributed to the erosion of the wealth of traditional knowledge. However, as the customary marine resource management practices are increasingly not practised, traditional knowledge about customary management decreased. This trend is evident and has the potential to increase in the future.

8.5 Chapter summary

There is a dynamic two way relationship between livelihoods and customary marine resource management. That is, livelihoods affect customary marine resource management and vice versa. This means any changes in any component of the Sustainable Livelihoods Framework affects the entire livelihoods system. The fact that the livelihoods of the villagers changed over time in the three case study villages illustrates the dynamic nature of the relationship between the other components of the livelihoods system with customary marine resource management under customary marine tenure.

The nature of the relationship between the livelihoods and customary marine resource management was more culturally oriented and more traditional. All the aspects of customary marine resource management were interwoven with their villager's culture. Over time the different factors affecting customary marine tenure and livelihoods systems of the villages, shaped and determines the nature of the relationship between each other.

It appears that the "point in time" when the different factors began to affect customary marine resource management under customary marine tenure is a very important consideration. This is because it is evident from the three case study villages that as one factor began to affect the customary marine tenure, the implications of its influence on customary marine tenure led to another changes. This trend continues today. For example, Christianity has initially caused the villagers to do away with some traditional management practices and beliefs. This in turn partially caused the change in the status of marine resources. As marine resources continues to decrease, fisher folks strategized by resorting to various adaptive measures such as the use of modern fishing techniques and gear to ensure successful fishing efforts.

Because of this chain of periodic changes over time the nature of the relationship between the villager's livelihoods system and customary marine resource management also changed.

The fact that the customary marine resource management is affected by factors which are part of the villager' complex livelihoods system means it cannot be treated in isolation. For example, changes in

land use and the increase in human populations in the three case study villages directly have direct implications on marine resource management. The increased disruptions of the level marine resources due to heightened dependence are one of the main consequences.

In summary, the customary marine resource management under customary marine tenure is part of the villager's entire livelihoods system. The changes in the villager's livelihoods system have affected the customary marine resource management. On the other hand, the changes in the customary marine resource have also affected the livelihoods of the villagers. For this reason the study asserts that the nature of the interactions between livelihoods is two-way and dynamic. The relationship is very complex as it involves the entire villager's livelihoods system. Various factors are continually acting upon the villager's livelihoods and marine resource management. Moreover, livelihoods and customary marine resource management under CMT have also undergone changes over time.

Chapter 9: Conclusions, Recommendations and Policy Implications

9.1 Introduction

This research utilized a qualitative, inductive approach. It sought to explore, explain and describe the interactions and relationship between villagers' livelihoods and customary marine resource management in a remote province of the Solomon Islands.

The Sustainable Livelihoods Approach (SLA) has formed a key part of the research process, by providing an analytical framework against which to question the village research participants about the phenomena under study. This is complemented by other discourses in order to weave a backdrop against which the research is carried out, and to inform the choice of methods. Threads were drawn from gender and development theories.

Based on the research findings and the subsequent discussions in previous chapters, a summary of conclusions from the research findings is contained in the first section of this chapter. The chapter also provides lessons learnt from the study, recommendations and policy implications of the research findings and suggestions for further research.

9.2 Summary of the research findings

This section draws together the conclusions from the research findings in the thesis. Specifically the conclusions highlight the answers to the research questions as presented in Chapter 1.

9.2.1 The state of livelihoods in the three villages

Livelihoods

The livelihoods system of the villagers in the three villages comprises of their livelihoods assets (natural assets, financial, physical, social, and cultural), livelihoods strategies, livelihoods outcomes and vulnerability context. Land and marine resources are the two main natural marine resources in the three case study villages. The levels of marine resources and land resources owned by the villagers have decreased, but of the sense that there has been a shift to an increased dependence on marine resources. While the three villages were endowed with almost the same kinds of marine species in the past, in the contemporary context the kinds of marine resource they own and have access to differ greatly. Various factors have contributed to the decrease in marine resources in the three villages. These include breakdown of the traditional leadership system, increased population, over fishing, resettlement, increasing need for money to meeting changing cultural obligations, expansion and introduction of new marine product markets, increases in the number of fishermen, women's increased involvement in fishing, use of modern fishing gear and techniques, more frequent fishing, growing ignorance of boundaries between sub-villages, changing attitudes towards marine resource

management, rubbish disposal, changes in land resources and changes in market prices between land and sea resources. Although most of these factors are evident in the three villages some are more prevalent in certain village(s).

The traditional financial assets are no longer functional as the village economy continues to integrate into the modern economy. Traditional knowledge which used to play an important part in the lives of the villagers has also decreased. Social and cultural assets owned by the villagers do not compare favourably to what they used to be.

9.2.2 Customary marine resource management under CMT in the three villages

The principle elements

There were no set rules that governed the customary marine resource management under customary marine tenure in the three villages. This study, however, reveals that customary marine resource management in the three villages is inseparable from these principle elements; customary marine tenure which covers customary marine boundaries, rights and traditional governance (the management), customary marine resource management practices (traditional knowledge, beliefs, taboos, seasonal closures, gender involvement in fishing) and traditional fishing (techniques and gear). The principle elements of customary marine tenure are part of the villagers' livelihoods system. These elements are rooted in the villagers' culture.

The state

Customary marine resource management was effective in the past. As identified above, the principle elements were very effectively followed and the entire system was intact. Much of the major changes to customary marine resource management have occurred after the 1980s. Consequently customary marine resource management in the three case study villages is no longer as effective as it used to be in the past.

The factors affecting customary marine resource management under CMT and their implications

Various factors have affected customary marine resource management in the three case study villages. These factors can be internal or external to the three case study villages. The internal factors include the use of modern fishing techniques and gear, increases in population, settlement patterns and changes in social and cultural assets.

The external factors include influence of colonization and the recent modern system of government. Both have caused changes to the traditional leadership system of the three villages. Moreover, they affected the traditional notion of property, as some customary coastal lands have been acquired by the Government for development and resettlement purposes. Economic development is another external factor. To foster economic development, the National Government introduced markets for commercial

marine species. This has contributed to the reduction in the responsibility over marine resources contained in customary areas under their jurisdiction.

Expansions to these commercial marine product markets and the introduction of new ones have caused more harvesting to take place. This is so because there is now there is a pressing need for money within their increasingly monetized village economy. In addition, the monetary rewards for the commercial marine species are increasingly attracting more villagers into fishing. Modern education is another factor considered to have significantly contributed to the reduction in the traditional knowledge necessary for customary marine resource management in the three villages. Christianity has influenced much of the traditional beliefs that partially form the basis of customary marine resource management in the three villages.

9.2.3 *The influence of villagers' livelihoods system on customary marine resource management*

It is apparent from the three case study villages that the changes in the villagers' livelihoods largely explain the changes in customary marine resource management in the three villages.

This study points out that the changes in the villagers' livelihoods assets also have implications on customary marine resource management in the three villages, in particular the principle elements of customary marine resource management. Changes in the land resources available to the villages have caused some fisher folks to opt to use marine resources to earn income and obtain protein.

9.2.4 *The influence of villagers' livelihoods system on customary marine resource management*

The study has argued that the changes in customary marine resources management also affect the livelihoods of the villagers. The relationship between customary marine resource management is two way. The initial changes in customary marine tenure over the past years have affected the other components of the villager's livelihoods. The changes in customary marine tenure affects the livelihoods of the villagers through the changes in the status of marine resources, fishing, customary marine boundaries and rights, changes in village management authorities and management practices. This is so because these are critical elements of customary marine resource management under customary marine tenure.

9.2.5 *The description of the interaction and relationship between livelihoods and customary marine resource management*

There is a two way relationship between livelihoods and customary marine resource management. That is, livelihoods affect customary marine resource management and vice versa. The different components of their livelihoods component include livelihood assets, institutions, processes and policy, livelihood strategies, outcomes and vulnerability context. This means any changes in any component affects the entire livelihoods system.

The relationship between livelihoods and customary marine tenure is not static but dynamic. The fact that the livelihoods of the villagers, including customary marine resource management under customary marine tenure changes over time in the three case study village illustrates the dynamic nature of the relationship between the other components of the livelihoods system with customary marine resource management under customary marine tenure.

All the aspects of customary marine resource management were interwoven with the villager's culture. Over time the different factors affecting customary marine tenure and livelihoods systems of the villages, shapes and determines the nature of the relationship between each other. The "point in time" when the different factors began to affect customary marine resource management under customary marine tenure may be a very important consideration. This is important because it is evident from the three case study villages that as one factor affected the customary marine tenure, the influence led to another phase of change and the trend continues till now. Because of this chain of periodic changes over time, the nature of the relationship between the villager's livelihoods system and customary marine resource management also changed.

Every component of the villages' livelihoods system influences customary marine resource management. These components are continuously changing causing changes to the nature of the relationship with each other.

9.3 Recommendations and policy implications of the research findings on marine resource management

Based on the findings of this research, I have put forward some recommendations. They are as follows:

There should be an awareness Programme at the village level to make the villagers aware of the importance of their marine resources and the need for its sustainable management. This awareness programme should also highlight the implications of unsustainable management on livelihoods. The Programme should encourage cooperation between the village people and leaders, and strengthen the principle elements of customary marine resource management.

Since the customary marine resource management is no longer effective and the management by the government is faced with many institutional issues, the direction should then be towards partnership-based management. That is, the government and the village people should work together in managing marine resources. This should build on what the people have and know about the marine resource management based on their traditional knowledge.

9.4 Suggestions for further research

The following are some suggestions for further research:

- Should the Government opt to implement the partnership-based marine resource management regime, the key stakeholders in such management regime are the rural communities. This is especially so in more remote regions like Temotu Province. Moreover, customary marine tenure is one of the principle elements of the partnership-based management. For this reason, an understanding of the interactions between coastal rural communities' livelihood and customary marine resource management is necessary.
- There is a need for quantitative research which involves a holistic analysis within a systems framework. This may involve bio-economic modelling, the study of marine habitats and environments and the use of scientific indicators to measure changes in fish stocks. There is also a need to use quantitative methods to measure changes in livelihoods of the people and their impacts on marine resource management to establish linkages between livelihoods and customary marine resource management under CMT.
- To take into account temporal and spatial considerations, there is a need to conduct similar case studies in other geographical areas and at different times. This is because livelihoods, the status of marine resources, CMT arrangements and people's emic views change over time and space. Such studies may not necessarily be in Temotu Province but elsewhere so as to ascertain differences and/or similarities.
- Quantitative studies may need to be conducted to test theories/prepositions emanating from this study. This is necessary because testing of theories/prepositions are beyond the scope of this study.

9.5 Chapter summary

Overall, it is evident from the findings that customary marine resource management in the three case study villages has declined. Specifically, the principle elements that formed the basis of customary marine resource management have changed over recent decades. While the principle elements of customary marine tenure are still there, there have been changes to user rights and the traditional management of traditional village leaders. Marine resources in the three villages have decreased due to various social, cultural, economic and environmental factors. At the same time, the villages have become more dependence on marine resources. The kinds of management practices used in the past are no longer effective. Though regarded as management measures, it is now inevitable that they will fail in the contemporary context. The contribution of traditional fishing to marine resource management in the past is no longer present. While these elements are rooted in the villagers' culture, unfortunately the villagers' culture over the past years has changed, perhaps irrevocably.

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Appendix 1: Checklist of sample research questions

I. GOVERNMENT OFFICIALS QUESTIONS:

a. Fisheries officials:

1. Which commercial species found on coastal areas are managed by the government?
 - **Prompts:**
Can you list them?
2. What are the government policies in place in relation to the management of coastal marine resource management?
 - How effective are the policies in place to manage artisanal fishery?

Prompts:

What are the management measures in place for each of the commercial species managed by the government?

Who is responsible for enforcing these management measures? The central Government or the Provincial Government?

Do you think the management measures are effective?

If no, then what the main management issues management?

How would you comment on the level of the peoples' compliance with these measures?

What are the things you think should be done and by whom?

- How would you comment on the management of the subsistence fishery, which is basically under customary marine tenure?

Prompts:

Who is responsible?

What do you think are the main issues?

What is the level of partnership between the customary marine resource management and the

government?

Do you think moving towards a partnership-based management is an option?

3. What are the aspects of livelihoods that the government placed on artisanal and subsistence fishery?
 - In what ways do you think the government is ensuring sustainable marine resources for sustainable livelihoods for the rural people?

Prompts:

Has there been any rural fisheries project to increase benefits (in terms of food and income) the rural people are getting from their coastal marine resources?

What markets are out there, arranged by the government, for the people to sell their rural fisheries products or catch?

What opportunities (in terms of finance, advice, etc.) are out there, offered by the government, for the rural people to use in order to sustainable manage and even develop their coastal marine resources?

II. PRIVATE BUSINESS ENTERPRISES QUESTIONS:

1. What type of commercial species does the private business enterprise buy?

Prompts:

Which commercial species (coastal) do you buy?

At what price do you buy from fishers?

Do you intend to increase your purchase or not?

How often do you buy from the fisher folks?

Do you buy directly from the rural people or from a middle man who buys from the rural people?

What do you normally do with the marine products that you buy? Sell domestically? Export?

2. What is your perception about the opportunities and potential provided by fisheries and marine resource?

- Why did you make the choice of a fisheries enterprise as a business option?

Prompts:

Do you think there is a great opportunities provided by marine resources?

Do you have any relationship with the relevant Government Departments?

How sustainable do you think the fisheries resource is?

3. In what ways do you think your business is contributing to the livelihoods of the rural people?

Prompts:

Do you think it has done much?

III. FISHER FOLKS AND BIG-MEN QUESTIONS:

a. Management under customary marine tenure (CMT).

1. What are the general characteristics of customary marine tenure and how does it works in case study village?

- Can you tell me about customary marine resource management under CMT in your village?

Prompts:

In the past how do people manage their coastal marine resources?

Is it managed by both the tribe/clan that owns the land adjacent to it?

What is the management role of the different members of the tribe (Both male and female)?

What is the role of the Big-man in managing the marine resources?

How far out is the jurisdiction of the customary management under the customary marine tenure?

- Could you explain “rights” to coastal marine resources in relations to customary marine tenure?

Prompts:

Who has the primary rights and secondary rights to a particular coastal marine resource?

How the primary is right transferred?

2. How effective is the customary marine resource management regime under customary marine tenure at regulating marine resource use, access and management in your village?

Prompts:

Do you think customary marine resource management under customary marine tenure is effective in defining who uses and access the marine resources?

In what ways do you think it effective?

How could you compare its effectiveness now to how it was in the past? Is there any difference or not?

3. What are the internal external factors affecting customary management under Customary Marine Tenure?

- Have you noticed any changes to customary marine resource management under the customary marine tenure?

Prompts:

What factors do you think has contributed to those changes?
Which factors do you think are more significant?
Are those factors internal or external to the village?
How has the factors impacted on the customary management coastal marine resources?
Do you think something should be done about it?

4. What is the level of compliance with management measures in place on commercial species at the village level?
- How could you describe the level compliance with management measures in placed by the government?

Prompts:

Which species are managed by the government that are normally harvested?
Do the coastal marine owners such as the tribe leader or the big man have any influence in the over species management?
Do many people comply with the regulations?
What do think could be the reasons for not complying?
Do you think those regulations sufficient?
What do you think could be done for improvement?
Is partnership-based (government and the community) management an option?

5. What are factors are threatening the sustainability of coastal marine resources?
- Do you think the sustainability of the coastal marine resources is threatened?

Prompts:

What are the things that you think are threatening the sustainability of the coastal marine resources?
Whom do you think is responsible?

b. Livelihoods

6. What is the importance of coastal marine resource to the people, as a livelihood asset?
- How important is the coastal marine resources to you as a livelihood asset?

Prompts:

Do you think marine resources are more important than other resources that are available to you?
And why is that so?

7. What is the importance of fishing to the people, as a livelihood strategy?
- Why do you go out fishing?

Prompts:

Is it for subsistence purpose?
Or is it for selling (artisanal)?

- How important is subsistence fisheries as a livelihood strategy for you?

Prompts:

Does it provide the main source of protein?
Are there other cultural significances of subsistence fisheries?
Which species do you normally catch or harvest?
What kind of fishing gears do you normally use in this fishery?
Which fishing techniques do you normally employ?

- How important is artisanal fisheries as a livelihood strategy for you?

Prompts:

Is it the main source income for you? If no, what are your other sources of income?

To whom do you normally sell your products?

What do you think of the market of the fisheries product you sell? Is it stable or not?

Is the price that you sell your catch or harvest attractive?

Do artisanal fisheries provide a kind informal employment for you?

8. What types of commercial species are commonly harvested?

- Can you comment on the types of commercial species you normally harvest or catch?

Prompts:

Have noticed changes in their stock level?

If decreased, then what do you think are contributing factors?

What kind of fishing gears and techniques do you normally use?

Appendix 2: Research timetable summary

	Dates
Interviewees based in Honiara:	
Ministry of Fisheries (3) Private Business Enterprise (3)	28th April to 14 th May
Interviewees based in Lata:	
Extension Officer (1) Private Business Enterprise (1) Provincial Government Officer (1)	15 th May to 17 th May
Village-based interviewees:	
Village A	
AMO1	17 th May
AMO2	18 th May
AMY3	19 th May
AMY4	20 th May
AMY5	21 st May
AMY6	22 nd May
AMY7	23 rd May
AFO1	24 th May
AFO2	25 th May
AFY3	26 th May
AFY4	27 th May
AFY5	28 th May
AFY6	29 th May
AFY7	
Village B	
BMO1	1 st June
BMO2	2 nd June
BMY3	3 rd June
BMY4	4 th June
BMY5	5 th June
BMY6	6 th June
BMY7	7 th June
BFO1	8 th June
BFO2	9 th June
BFY3	8 th June
BFY4	9 th June
BFY5	10 th June
BFY6	11 th June
BFY7	12 th June
Village C	
CMO1	14 th June
CMO2	15 th June
CMO3	16 th June
CMY4	17 th June
CMY5	18 th June
CMY6	19 th June
CMY7	20 th June
CMY8	21 st June
CFO1	22 nd June
CFO2	23 rd June

	Dates
CFO3	24 th June
CFY4	25 th June
CFY5	26 th June
CFY6	27 th June
CFY7	28 th June
CFY8	29 th June
	30 th June

Note: Interviews and interactions with key informants and village leaders (elders, councillors and chiefs) was frequent but on an ad hoc basis.

Appendix 3: Field procedures

1. Upon arrival in Honiara, Solomon Islands, I contacted by phone the Ministry of Fisheries and Marine resources. The phone call sought their permission to interview member of staff and also finds out when the interview would be appropriate for them. During this time, I made clear to them how long the interview would take and how long I was in Honiara so that they could allocate an interview time during my stay in Honiara.

The first officer (Management Division) that I interviewed directed me to the second (Rural Fisheries Development Division) and third officers (Research Division) that I interviewed from the Ministry. Secondary data (e.g. information marine resource management in the Solomon Islands) were collected. In addition, I was able to access the contact details of the private business enterprises which I have interviewed.

2. The private business enterprises were contacted by phone and in person. Likewise I had to ask for permission first and a representative was selected by their business. Again primary and secondary data were collected.
3. When I arrived in Lata I immediately contacted my research assistant. I oriented the research assistant first before starting the interviews regarding his role during the research and some ethical consideration that he had to be aware of prior to commencing the interviews. The ethical considerations are contained in Section 5.12.
4. Once I had completed orientation with my research assistant, a letter seeking permission to conduct research in the three case study villages was sent to the elected Ward members and the village leaders. Letters were hand delivered to them. A copy of the permission letter is attached in appendix 6. The villagers were informed by Church announcements. Once I got the village leader's permission I started conducting the research.
5. Prior to conducting the interviews I made contacts with key informants in the three case study villages. With their assistance I was able to select ten research participants, plus the additional research participants suggested by the village leaders.
6. Once the names were finalized the interviews began, with Venga village, then Neo and Graciousa Bay. The tentative timetable used to conduct the interviews is provided in appendix 2. While in the village I commenced with a transect walk to familiarize myself with the village physical environment and the people. This was followed by semi-structured interviews, observations and interviews with the key informants.
7. Every effort was made to accommodate human and cultural ethical requirements.

Appendix 4: Copy of consent form

Consent Form

Name of Project: _____

I have read and understood the description of the above-named project. Specifically in relation to:

- the aims of the project
- how the information is going to be collected, and
- how the information is going to be used

On this basis I agree to participate as a subject in the project, and I consent to publication of the results of the project with the understanding that anonymity will be preserved.

I understand also that I may at any time withdraw from the project, including withdrawal of any information I have provided at anytime up to 11th July 2007.

I agree or disagree that my interview be recorded.

Name: _____

Signed: _____ Date: _____

Appendix 5: Research information sheet

Division: Agriculture and Life Sciences Division – International Rural Development

Research Information Sheet

You are invited to participate as a subject in a project entitled:

Name of research: Livelihoods and Customary Marine Resource Management under Customary Marine Tenure. Case Studies in the Solomon Islands

The aim of this research is:

- This research project is being completed as part of Masters Degree in International Rural Development.
- To gain insights and understanding into the nature of the interaction and relationship between rural coastal livelihoods and marine resource management under CMT arrangements.
- To inform rural development policy on ways to mitigate adverse impacts and possible alternative marine resource management regime.
- To give the village people a voice
- To serve as a foundation study for further research in the same topic and in the case study region and villages.

Your participation in this research will involve:

- A short interview with me (the researcher). This will take about 1 hour (village participants) and 20 minutes (government officials and fisheries business enterprises).
- Answering some questions that will be asked of you, but you are welcome to add any other information which you feel is relevant or important.
- If you agree, then the interview/discussion will be tape-recorded, if you prefer not to, then it will not be taped. It is entirely your choice.
- If you want to review the tape transcription, then it will be made available to you.

As a follow-up to this activity, you will be asked to: (*applicable to village participants only*)

- Participate in a focus group discussion after individual interviews are complete. This will be an opportunity to capture what has been left out during individual interviews.

In participating:

- If you do not understand a question, you may ask for clarification, and I will give clear explanation of the question.
- If you prefer not to answer some questions, you may say so.
- If you would like to stop the interview, you can do so at any time whether beforehand or during it.
- This research may be published, but any information you provide will be kept confidential. You will not be identified by name, by ministry, or by business name. Instead, you will be referred to with generic names such as participant #1, government official #2 or business owner at..” respectively.
- If you would like to have your information withdrawn from the study, you can do so beforehand or during the interview. Or you can do so after the interview by e-mailing me with your personal code number. This number is _____. The last day that you can have your information withdrawn from the study is 30th June 2007.

The project is being carried out by:

Name of principal researcher Rose Tungale

Mailing address: Lincoln University, P.O.Box 84, Canterbury, New Zealand

E-mail address: tungalr2@lincoln.ac.nz, Tel (Mobile) 0212348680

He/She will be pleased to discuss any concerns you have about participation in the project.

Name of Supervisor: Dr. Miranda Cahn

Contact Details: E-mail: cahnm@lincoln.ac.nz

The project has been reviewed and approved by Lincoln University Human Ethics Committee.

Appendix 6: Copy of permission letter

Luebava Village,
Santa Cruz Temotu Province
Date: 15th May 2007

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.....
.....

Santa Cruz Islands
Temotu Province

Dear,

Re: SEEKING PERMISSION TO CONDUCT RESEARCH IN
THE.....VILLAGE

I am Rose Tungale, a research student from Lincoln University in New Zealand. I am currently here in the village to conduct my research. This research is part of my Master's programme academic requirement. The research is village-based. Given below are the main details about the research:

Research Topic:

Livelihoods and customary marine resource management under customary marine tenure: Case studies in the Solomon Islands.

Research Aim:

1. To gain insights and understanding to the interactions and relationship between livelihoods and customary marine resource management under customary marine tenure.
2. To possibly inform rural development policy on ways to mitigate adverse impacts on coastal marine resources, and if necessary, could inform an alternative marine resource management regime in the Province.
3. To give the village people a voice
4. To serve a foundation study for any future research in the same topic and in the case study region and villages

This letter serves to inform you that I have purposively selectedto be one of my case study villages. Therefore I am seeking your permission if I could conduct research in your village. And should I be given permission I intend to interview some villagers. To ensure gender balance I wish to interview equal number of male and female. A list if intended participants to interview will be shown to you upon arrival in the village.

Should I be granted permission I would request if you could make the villagers aware of my coming and what I will be doing during my stay in the village. I suggest an announcement after the Sunday church service by the church keeper.

I would really appreciate an immediate verbal or written response from you.

If you have any further question, contact me.

Yours faithfully,

.....
Rose Tungale
(Research student)

Appendix 7: Brief description of factors contributing to decrease in marine resources

Factors	Brief descriptions	Methods of data collection
1. Institutional changes: Less respect for Letaluas	- Changes in the traditional and village institutions and processes have had partial implications on the functions of customary management	Interview/ observation
2. Population increase	- Increase in village population has caused increase harvest of marine resources	interview
3. Resettlement	- Increased village population has lead to limited space to build house causing more families to create new or move to settlements. Sometimes resettling is an individual family choice. Resettlements destroy fishing grounds in two ways. With new settlements, it causes damage on reef protection barriers such as shore trees and also it sometimes affects traditional fishing areas. And resettlement causes increases population in that resettled locality causing pressure on the marine resources.	Interview/ observation
4. Need of money to meet changing cultural obligations and life style	- The changing cultural obligations such as marriage and changing village life style have caused more people to fish. They regard fishing as quick money.	Interview/ observation
5. Market influence	- Introduction of marine product markets coupled with the attractive prices offered, has attracted more into the fishery	Interview/ observation
5. Cyclone and sea level rise	- Previous cyclones (insert names) have caused erosion, damage to marine resources habitats. This has caused some marine species to decrease. Rise in sea level is obvious is some areas causing inundation and destroying some shore marine habitats.	Interview/ observation
6. Increase in number of fishermen	- More fishermen and engaging in fishing activities over last two decades. This is due to increase in population and easy access to fishing gear and technique.	Interview
7. Fishing techniques	- The modern fishing gear and techniques has increased fishing efforts. Modern fishing net is frequently mentioned as destructive.	Interview/ observation
8. Frequent fishing	- Everyday people fish exerting pressure on the marine on targeted marine species.	Interview/ observation
9. Women's increasing involvement in fishing	- Women's involvement in fishing is claimed to be one factor that have contributed to decrease in marine species.	Interview
10. Ignorance of boundary within village (people fishing together)	- Boundaries within village are no longer effective, instead people fish anywhere within the village boundaries.	Interview/ observation
11. Changing attitudes towards management- disobedience and Ignorance	- Older research participants claim that villagers' disobedience has also caused issues in marine resources management.	Interview
12. Rubbish disposal	- Villagers use the sea as their rubbish dumping place. This has affected the habitats of marine species.	Interview/ observation
13. Bleach run off	- A point raised in Graciosa Bay. Because village water supply is always a problem, villagers use the fresh water run off on the sea shore to do their laundry. Bleach is very common causing some marine species to die.	Interview
14. Oil run off from logging site	- Oil run off from logging site was mentioned by some research participants has caused oily sea surface. This makes it hard for offshore fishermen to catch bait (surface marine species) such as bonito. Also it cases their string to be oily and therefore very slippery to pull.	interview
15. Changes in land resources	-Because land shortage caused them to fish, thus increasing the number of fisher folk	Observation
16. Changes in the market and prices in agricultural product	-The inefficient and unattractive copra and cocoa markets have caused many villagers to fish, thus increasing the number of fisher folks.	Observation

Appendix 8: Glossary of Local Words

Local word/phrase	Names/Meaning/ Description in English
Ba	Turmeric
Bamboo fishing	A fishing technique which involved the use of string tied onto bamboo.
Be	Sea cucumber
Bech-de-mer	Dried sea cucumber
Benia	Trochus
Ber	Refers to fishing net
Ber nalir	A traditional fishing technique which involved the use of small nets along the seashore.
Bernoku	A traditional fishing technique which involved the use of a floating fish trap filed with bait. This fishing technique was done near the seashore.
Betelnut	Native fruit tree for chewing
Birlu	Needle fish
Blapu	Blackbar Soldierfish
Blir bia	Spider web
Bonia	A Bonia is a cultural title, which is higher than a Letalua. A Bonia earned his cultural title through hard work and the display of certain qualities, which include being wealthy (with the most beautiful dark-red feather money), knowledgeable in history and custom, good decision-maker, influential, well respected, brave, and a warrior.
Bu	Triggerfish
Bualver ngade	Refers to the fishing hook curved ends
Buri with birlirlir	A traditional fishing nets which involved building heaps stones (buri) to attract fish and later surrounding the location with coconut fronds (birlirlir) to trap the attracted fishes.
Coiya	Nerite (polished, plicate, oxpalate)
Dambu	One species of clam shell
Dirlve	Young black jack
Erda	One species of clam shell normally attaches itself to a rock.
Erpe	Garibaldi/grouper
Fish poisoning	A traditional fishing technique which involved the use of poisonous leaves to kill fish during low tides.
Jo'ober	Bigeyed bream
Kawile mapa	Crossing the reef
Kumara, pana	Native types of edible staple root crop
La'ake	Land mark used by fishermen use to identify there fishing location.
Lapnge	Traditional tool that is used to empty water from canoe

Lau	A shell that lives on rocks on the seashore and on the reef
Lekona	Tobacco
Lenga	Reef crab
Lenialu	Traditional fishing technique which involved the use of coconut fronds to trap fish.
Ler	Spider Conch
Lerda	Coral
Letalua	Traditionally, every older man (including married males) was culturally regarded as a Letalua.
Lirpa nesa	Traditional cloth made from banana fibre
Lo yam	Reef crab
Loba	Butterfly fish
Lodei	Crayfish
Lolir	Brown coloured Seaweed
Loprau, kilu, bono, derngi	Native types of cabbage
Lu oterpia	Coral that grows like an umbrella on the reef
Lve'e	Sand fish
Mabeu	Family home where the children, females and the parents dwell.
Madai	men's lodge
male or malip	Special bush rope traditionally used as nails
Malir	A special grass traditionally used to indicate seasons of the year, etc.
Mapa	Tide or particular location on the reef
Mapa nia lir mabe	Refer to the tide that is not too low and high
Mo	Octopus
Na avonga nae popa	Warfare settlement
Na ayelanga	Marriage dowry
Na e'er	Moray
Naelue	Income source
Nano'o	Coral/Rock that can grow in the sea
Napa, nerver dance	Types of custom dances
Natungu	the language spoken by the people of Santa Cruz
Neni	Special cane plant
Ner amer luenger	Respect
Ner er fishing	A traditional fishing technique used to fish for nerer. Basically involved catching pond fish in ponds on the seashore.
Ner er lengitinger	Obedience

Ner tulegimnga	Another traditional fishing technique. It involved a person walking along the seashore with a spear.
Ner u	Turtle
Nerer	A small fish that lives in ponds on the seashore.
Nesau	A sea shell call Leopard cone
Niber no vo	Refers to where wave break
Nibulala	A shell call strawberry conch
Nimu erli	Coloured seaweed. Normally attaches itself to corals and rooks on the reef.
Niver	Love
Nobo	Special bush tree used as floaters
Nobu	Special tree that is used to build outriggers
Nomer	Surface migratory fish.
Nouno	wood
Nugir	Bream
Nui lir or neidulir noblo ke'esa	Same generation of people
Nui'i	Rope
Numbli	Turban
Nuni	Mat
Peli	Asaphis
Sago palm	A Palm tree. Its leaves are used to thatch roofs of houses
Taboo	Refers to the banning of a particular reef area or marine species
Tamo	Sergeant Major
Tave, neyu, ingcori, breadfruit	Native types of edible fruit tree
Tekave	Sea slug that leaves on the sea shore
Teklava	White -Margate
Tema	Refers to the hard part of numbli or the moon or a traditional ornament.
Tepasoli	Special bush rope used for tying
Terblaile	Red grouper
Termotu	An island
Tervau	Money
Tirmtau	Refers to hook
Tou	Floater
Tou er malibir	Traditional fishing technique used to fish for malibir. It involves the use of floater and traditional fishing line and hook to catch malibir.

Tou er merlir	Traditional fishing technique used to fish for needlefish. It involves the use of floater and traditional fishing line and hook to catch needlefish.
Wangi	Sea slug that lives on the sea shore
Webu	Redeyed reef crab