

**University of the South Pacific
School of Marine Studies, Faculty of Islands and Oceans**

RESEARCH PROPOSAL

TITLE OF PROJECT: The Status of the Subsistence Fishery Resources of
Rotuma Island, Fiji

PRINCIPAL RESEARCHER: Teri Tuxson

RESEARCH SUPPORT STAFF: 1 field guide

PRINCIPAL SUPERVISOR: Mr. Ed Lovell

ASSISTANT SUPERVISOR: Professor Randy Thaman

DURATION OF PROJECT: 2 years

DATE OF SUBMISSION: 10th August 2006

SUMMARY OF BUDGET:

| | |
|-------------------------------|--------|
| Travel | \$2510 |
| Subsistence and accommodation | \$2235 |
| Equipment and consumable | \$490 |
| Research Support Staff | \$1200 |

TOTAL \$6435

PREVIOUS PROJECTS: No previous projects funded by USP

CRISP Progress Report – December 2006

By Teri Tuxson. Project for MSc.

Title:

The Status of the Subsistence Fishery Resources of Rotuma Island, Fiji

Abstract:

Pacific Island peoples have relied on the ocean to sustain their livelihoods for centuries, and the ocean and its resources continue to do so. Factors including increasing populations, improved technologies and increased fishing pressure have urged communities to manage their fishery resources. The aim of this study is to describe the status of the subsistence fishery resources of one such Pacific island community, Rotuma Island. Rotuma is an isolated island community located 465km north of Fiji. The locals rely on fishing activities on a daily basis to provide their protein requirements. This study is important in that it will provide baseline data on the fishery resources of Rotuma, assist in recommending management strategies for these resources, be able to be used as a comparison for future studies, and also act as a capacity builder for members of the island community.

Aims/Objectives:

The purpose of conducting research from a socioeconomic perspective is to determine the importance and value of the subsistence fishery resources to the general community in Rotuma and the status of these stocks available to the community there. This will be able to help generate greater support for better coastal management amongst the different districts on the island. This can be accomplished through the identification of the fishes

and invertebrates targeted by fishermen, the major habitats in which they live, threats and problems affecting these resources, solutions and/or recommendations for these problems and realistic opportunities available to the Rotuman community. The study will also include compiling a record of the cultural traditions associated with the various fishing methods and a chance to preserve these age-old traditions. In addition, the collected information will establish baseline data for future studies of a similar nature.

CRISP Activity:

Project 2 – Activity 5 (Previously Outcome 2 – Activity 8) – Broaden the integrated approach to reef fisheries by involving socio-economists, geographers and anthropologists, in order to take into account stakeholder strategies and local community perceptions in resource and socio-economic environment assessments of fisheries, in particular public policy relating to fishery products and markets.

Achievements Till Date:

1. Rotuma Council has granted permission for research to be conducted. MOU between student and *LajeRotuma* Initiative has been signed
2. First trip to Rotuma is completed. See Expedition debrief.

Expedition Debrief:

1. Rotuma trip departed November 12, and arrived on the island on November 14. This first trip consisted of the underwater visual surveys. *LajeRotuma* Initiative conducts annual monitoring of the reefs around Rotuma so a group of volunteers participated in the GCRMN surveys. The six volunteers for the November-December 2006 Rotuma Coral Reef Conservation Project (RCRCP) came from

WCS, and USP, and were already experienced in the monitoring of coral reefs. As the project is considered to be a collaborative effort between organizations, I was responsible for organizing trip logistics, participants and equipment. I was also responsible for the community training on the island. The community training involved a series of workshops to be held on the island before the monitoring begins. The workshops included training on coral reef ecology, survey techniques, target or important organisms, and also stakeholder input. Fifteen to twenty local community participants attended the training. The group also visited five villages as part of conservation awareness for Rotuma and its natural resources. As part of the monitoring, there were 17 sites located around the island that were scheduled to be surveyed. However, two could not be surveyed due to rough weather.

2. Upon return from the first Rotuma trip on December 10, 2006, the collected data is still to be analysed. Data entry was done on the island. I will also begin preparing for the second trip to Rotuma – this is scheduled for late February or March. The purpose of the second and third trips to Rotuma is to collect information from the household interviews, creel surveys and stakeholder meetings. There are three districts to be surveyed – Noatau, Malhaha, and Pepjei. Questionnaires for the household interviews and creel surveys are in preparatory phase.

Expenses:

There have not been any major expenses as yet. This is because as a participant in the *LajeRotuma RCRCP* expedition, all expenses were covered by *LajeRotuma Initiative*.

Research proposal

Abstract:

Pacific Island peoples have relied on the ocean to sustain their livelihoods for centuries, and the ocean and its resources continue to do so. Factors including increasing populations, improved technologies and increased fishing pressure have urged communities to manage their fishery resources. The aim of this study is to describe the status of the subsistence fishery resources of one such Pacific island community, Rotuma Island. Rotuma is an isolated island community located 465km north of Fiji. The locals rely on fishing activities on a daily basis to provide their protein requirements. This study is important in that it will provide baseline data on the fishery resources of Rotuma, assist in recommending management strategies for these resources, be able to be used as a comparison for future studies, and also act as a capacity builder for members of the island community.

Objective:

The main objective of the study is to describe the status of the subsistence fishery resources of Rotuma Island. The research will be conducted for a Masters study through:

- 1) literature review
- 2) community meetings,
- 3) household interviews,
- 4) creel surveys,
- 5) underwater visual census.

A.) Introduction

Pacific island countries have been practicing various forms of fishing activities over time as fishing is an integral part of their traditional culture. The ocean has sustained the livelihoods of Pacific islanders and plays an important role in protein sustenance. Fish and seafood is a staple part of Pacific diet, especially for coastal populations.

Marine products are a good source of protein, and contain a number of essential minerals and nutrients. Fish is exceptionally rich in lysine and other sulphur amino acids such as tryptophane and methionine. Fish oil provides preformed Vitamin A, Vitamin B and Vitamin D and contains phosphorus, calcium, magnesium and potassium (Veitayaki 1995).

The fisheries of Fiji can be divided into three categories: 1) Subsistence fisheries for personal consumption, 2) Small-scale artisanal fisheries where the catch may be sold as full to part-time occupation, and 3) Industrial commercial fishing which is large scale, mainly for export, and employs the use of modern equipment and large fishing vessels. There is increased pressure on fishery resources as the population grows, demand for seafood increases, and the ocean faces other environmental hardships. This has not changed over time, fishing activities have been refined, technologies have changed, and marine products easier to procure, even though the resource is exhaustible.

Fisheries around the world have until recently been considered a relatively sustainable resource if the right measures are taken in managing this resource and correct

recommendations given to local communities, which will compliment already existing traditional management strategies. Island communities that still rely on subsistence fishing activity are no exception.

Subsistence fishing is defined as the component of the fishing activities in which the catch is not sold but is generally consumed by the fisherperson, and his or her family or friends (Rawlinson et al 1995). There are few areas left in Fiji that still possesses only the subsistence and artisanal fishery, minus any commercial fishing activity. This occurs mainly in the outer islands of Fiji. Subsistence fishing activity is an integral part of island society and is based on important and sensitive cultural arrangements (Tuqiri 1990). The fishing activity is labour intensive, and conducted along clearly defined sex lines (Veitayaki 1990). However, the lack of expansion of the small scale fishing economy can be characterized by a lack of basic capital, expertise, limited economies of scale, limited scope for high technology industry and also distance from major markets (Ram 1986).

There have been socioeconomic studies conducted around the Pacific and the islands of Fiji pertaining to subsistence fisheries. Surveys conducted in the Solomon Islands, Kiribati, Samoa, Tuvalu and the Federated States of Micronesia established that subsistence fishing provided all or a major part of the basic animal protein needs of the great majority of the indigenous peoples (Vunisea 1996). However, here in Fiji a compilation of all socioeconomic studies of the main islands and outer lying island communities has not been prepared. Studies of a similar nature have been carried out around Viti Levu by the Fisheries Division of Australia and the Fisheries Department of

Fiji and USP, Qoma Island, Kadavu, Lomaiviti and certain areas of the Lau Group, also by USP. According to the Fisheries Department in 1992, the estimated catch from the subsistence fishery was 16,400 tonnes (Rawlinson et al. 1995).

There are few island communities left in Fiji that still rely largely on subsistence fishing while the island's reefs remain virtually unscathed by commercial fishing. The aim of this study is to analyse one such island and the status of its fishery resources in Fiji, Rotuma Island.

Fig. 1: Map of Fiji



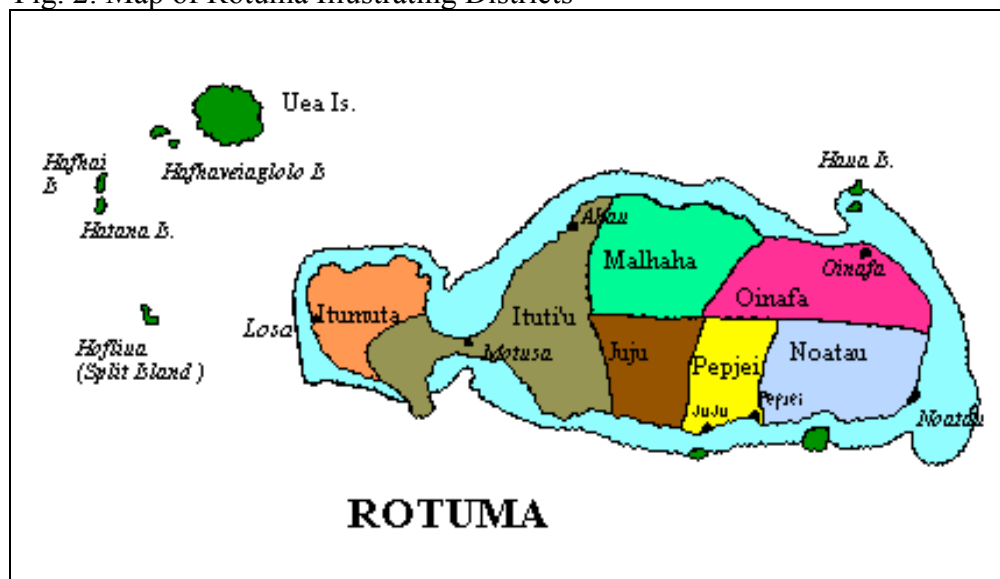
(Source: Murugan Research)

Rotuma is located approximately 465km North of Fiji (location: 16°35' S, 177°00' E) (Fig. 1). It is remote being the furthest island in the Fiji group. Rotuma is also excluded from the overall Fiji archipelago, and as indicated by the map, appears as an inset. Three

small volcanic islets and five reef islets surround the main volcanic island of Rotuma. These islets are respectively Hatana, Hafliua, and Uea, and Afgaha, Husia rua, Solkope, Solnahu, and Houa (Fig. 2). The total land area is approximately 43km² and is surrounded by an extensive fringing and barrier reef system.

The main island is volcanic with rich, fertile soil for agriculture and farming. There is only one small freshwater stream on the island and therefore, no mangrove or estuarine habitats are present. As mentioned before, the reef systems are extensive, possessing both fringing and barrier reefs. However, the reef flat is reportedly narrow and is usually less than 400m in width (D.O.F. 1983). The lagoons and adjacent fishing grounds still sustain the local diet. Seafood is a main source of protein for the locals.

Fig. 2: Map of Rotuma Illustrating Districts



(Source: Rotuma Website)

There are seven districts on the island, Itumuta, Itu'ti'u, Malhaha, Oinafa, Noatau, Pepjei and Juju (Fig. 2). Itu'ti'u is the largest district made up of six villages and has the highest population of all districts with 456 individuals (Ralifo and Fiu 2003).

The population carries a total of 1,358 people according to the last census conducted by *LajeRotuma Initiative (LRI)* in 2003. The population is made up mostly of young people whom when they come of age, leave the island for mainland Fiji. There has been a steady decrease in population over the last fifty years (Ralifo and Fiu 2003). This common practice occurs mainly to further their employment and education opportunities. Many send remittances back to the island to help their families. It is these remittances that play a vital role in economic terms, as more consumable items are bought in the village stores. The locals rely on canned fish and meat as an adequate source of protein.

Despite the heavy reliance of the locals on canned meat, there is a need to analyse the existing subsistence fishery of Rotuma. The last study of the fisheries resources of Rotuma was conducted in 1983 (D.O.F. 1983). Recently, the Rotuma Council gave LRI the official environmental advisory role to the Council and island community members of Rotuma. LRI already monitors the coral reefs around the island on a yearly basis and receives funding from the Global Coral Reef Monitoring Network (GCRMN). In its long-term objectives, LRI does have a focus on this unique subsistence fishing "economy." This study is considered to be a collaborative effort between organizations, including the University of the South Pacific, *LajeRotuma Initiative* and the Coral Reef Initiative of the South Pacific (CRISP).

Although Rotuma is considered a part of Fiji, there is no Fisheries Officer present on the island and there is no monitoring, including socioeconomic work, conducted by the Fisheries Department other than the one conducted in 1983. LRI has collected basic socioeconomic information from the local communities on the island but have only touched briefly on the fisheries aspect of things, despite fishing activities being an everyday occurrence. This study is an effort to continue to sustain the protein requirements of the local community while recommending plausible management strategies to help the island community preserve their resources. In order to ensure the economic viability of tropical fisheries, there is a pressing need to manage coastal habitats based on reliable scientific information (English et al. 1997).

The main aim of this study is to describe the status of the subsistence fishery resources of Rotuma by utilizing indicators of the resource's health. This includes species composition of the subsistence fishery, length and weight data of the catch, other biological data like catch and effort, environmental data and also traditional data (King 1995). Traditional information may include fishing methods still practiced, seasonal knowledge of the different species caught and also species that may be avoided for consumption.

B.) Background

Detailed socioeconomic surveys of any aspect of the marine environment have not been conducted on the island of Rotuma. The last general socioeconomic survey conducted by *Laje* Rotuma Initiative with the community was held in 2003. There were several

questions in the household questionnaires for the interview sessions that related to the marine environment. However, this survey was broad in nature, and not specifically concentrating on the marine environment, especially fisheries. The questions involved information on population, households, and numbers of the members of these households involved in fishing activities. Knowledge of the marine environment and its resources is considered to be at a high level (Ralifo and Fiu 2003). The community concerns in the fisheries sector included: 1) a decrease in the fish sizes and abundance over the last 10-15 years, 2) the use of poison fishing and other destructive fishing practices, and 3) the *Kama* phenomenon where a *Pavona* species of coral is growing rapidly, and has overgrown fishing holes. This coral even outgrows other coral species, out-competing them.

The report also documented that most of the fishing activities were performed by the men in the community (Ralifo and Fiu 2003). The most popular fishing method currently used is an improvised spear gun. This is fashioned by a strong rubber tyre band with a sharpened tip, steel rod. Net fishing is the most popular form of fishing activity for women, and this is handled by a few fisherwomen. The traditional net fishing method used is *hagoat vao*, and although it is becoming less frequent, it is still practiced on the island.

The Rotuma Coral Reef Conservation Project (RCRCP) is also undertaken by LRI and members of the island community. The project involves annual monitoring of the coral reefs around the island. LRI has been consistent in maintaining a yearly collection of

data. The data is collected through the use of underwater transect surveys analyzing biodiversity in the area. Several locals from the island have been trained in SCUBA and monitoring techniques through LRI and these volunteers are joined by a scientific team from the mainland. These expeditions are usually a collaborative effort amongst environmental organizations like the School of Marine Studies (SMS) and Institute of Applied Science (IAS) at USP, Worldwide Fund for Nature (WWF), and Wildlife Conservation Society (WCS), to name a few.

Taxonomic collections of fish data have also been collected by various university efforts. This includes USP as well as the monitoring performed by LRI. The last biological monitoring report was completed in 2004 by Sidney Malo. The RCRCP report established that the most common species of fish found were parrotfish and butterfly fish. Both fish families increased in number from what was found in 2003 to 2004. The target species list for monitoring also included commercially important fish species. This list consisted of species from the Grouper family (*Serranidae*), including the Coral Hind (*Cephalopholis miniata*), Peacock Grouper (*Cephalopholis argus*), Honeycomb Grouper (*Epinephelus hexagonatus*), and Lyretail Grouper (*Variola louti*). It was found that the mean count for commercially important fish for 2004 was 92% more in 2004 than in 2003 (Malo 2004). However, the Lyretail Grouper was left out of the survey in 2004, giving this data low diversity. During the 2004 expedition, a small-scale commercial fishing venture was being carried out on the island with the approval of the Rotuma Island Council where fishers would take their catch to the visiting fishing vessel (Malo 2004). However, there was no information gathered from this fishing venture.

The invertebrate list for the RCRCP included species which were targeted because they were considered to be commercially important. Those organisms on the list targeted because they were important for human consumption consisted of holothurians or sea cucumbers Brown Sandfish and Green Teatfish, giant clams (*Tridacna* sp.), trochus shell, octopus, and lobster (*Panulirus* sp.). The report found that an abundance of coral-based invertebrates indicated good reef health (Malo 2004).

The D.O.F. fishery resource assessment of Rotuma in 1983 was performed at the request of the Malhaha Co-operative which was interested in the possibility of artisanal and maybe even, commercial fishing. The survey was more of a resource assessment of biological aspects, including species composition and the total weight of the fish biomass in the resultant catch. It was not a socioeconomic survey. Members of the fishing families were also visited and community meetings held on the island.

The Fisheries Department report (D.O.F. 1983) analysed in-shore and off-shore resources at different locations around the island. The sites selected for in-shore resource assessment included Oinafa Wharf, Malhaha, Motusa, Noatau and Solkope Island. The sites selected for off-shore resource assessment included the outer islands Solnahu, Hatana and Uea, and the whale bank off the coast of Oinafa. The in-shore resource assessment focused on a number of target species, mainly for commercial purposes. The target species list consisted of beche-de-mer, trochus shell, pearl shell, lobsters, land crabs, and fish. The most common reef fish were recorded by teams whilst diving. The

reefs seemed to be carrying a relatively low biomass of fish relative to other reefs in Fiji (D.O.F 1983). They observed butterfly fish as the most common species on the reef. Lagoon fish included various mullet species. It is interesting to note that the report mentions the Warty-lipped mullet (*Crenimugil crenilabis*) as being dominant in several fishing hauls. This species was considered to be rare in most other parts of Fiji at the time.

The off-shore resource assessment possessed a different list of target species. This list included tuna, mackerel, and deepwater snapper. The survey found that the northern side of the island was most productive. The report describes “holes” along the whale bank off of Oinafa which were abundant with yellowfin tuna and skipjack tuna. Along the surface, double-lined mackerel was considered abundant. Over the bank, a large resource of emperors was also located. The whale bank is located approximately three miles from the island but was not assessed due to lack of technology on the research vessel. The fishing hauls from these expeditions made up eighty percent of the research boat’s catch (D.O.F. 1983). The resource was considered to have good potential because it was an unexploited one. This was also an issue of technology as at that time, there were not many fishermen who possessed outboard engines to reach this pelagic fishing zone. Outboard engines on the island have remained at a low level.

The report also indicates a market for the sale of shark on the island. If a shark is caught, several households in a village may have a hand in it and nothing is wasted. Whether this

indicates a market for shark meat on the island is debatable, despite suggestions by the report.

The fishing activities documented on the island twenty years ago were of a subsistence nature. These consisted of 1) small gill nets used in the lagoon areas, 2) handlining from traditional canoes, 3) hand gleaning of marine invertebrates from the reefs and reef flats, and 4) spearfishing reef fish and lobsters at night whilst using lanterns.

The report listed the problems faced by the island community at the time and these problems are the same ones that affect most isolated island communities. These problems are listed mainly: 1) the lack of an all-weather anchorage, 2) the absence of maintenance facilities for boats and ocean-going vessels, 3) fuel shortages, 4) the lack of ice, gear, storage and marketing facilities for fishermen, and 5) the isolation of the island. Even though this report is more than twenty years old, these same problems still affect the Rotuma Island community today.

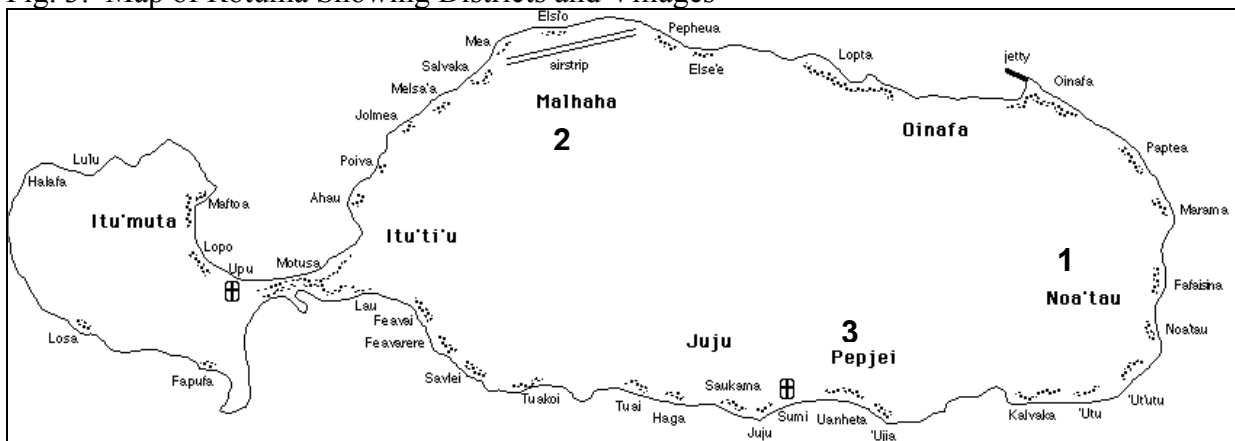
The Fisheries Department report also made recommendations to the community including improved fishing methods and the need to reserve the in-shore zone for subsistence purposes only. It has remained a subsistence fishery sector ever since. This may be due to the problems faced by the island community mentioned above, rather than an action on the advice of the Fisheries Department by the community.

C.) Research Methods

Research methods will include 1) a literature review, and 2) four to five field visits to the island to be co-ordinated with *Laje*Rotuma Initiative.

The field visits include underwater visual surveys, community meetings, household interviews, and creel surveys. Three of the seven districts on the island will be selected for the research areas. These areas are chosen based on the frequency of fishing activities that occur in the area, namely low, medium, and high use of fishery resources. The districts selected for this study are: 1) Noatau – high frequency of fishing activity, 2) Malhaha – medium, and 3) Pepjei – low (Fig. 3). This is based on the 2003 LRI Socioeconomic Report (Ralifo and Fiu 2003).

Fig. 3: Map of Rotuma Showing Districts and Villages



(Source: Rotuma Website)

Two of the five field visits will be to participate in the coral reef monitoring LRI undertakes every year. Two longer trips to Rotuma will be used to conduct the household interviews and creel surveys. The two longer trips will be for a period of one month per trip. The final trip will be to present the findings of the study and possibly make recommendations to the island community.

Within the selected districts, initial meetings with the community as well as talks with key informants of these communities will be held to inform the community first of the work that is to be conducted, and to receive the community blessing and assurance of assistance from the community members. Following the initial meetings, household interviews with the community members involved in fishing activities will be conducted. The household survey is vital to the overall socioeconomic survey of a community because it provides direct information about families such as demographics, economics, and resource use (Reynolds and Tawake 2006).

The interview involves the use of a standard questionnaire that will be the same for all households chosen to participate in the survey (Appendix A). The questionnaire was derived from combining the socioeconomic survey format from the Australian Institute for International Agricultural Research (Rawlinson et al 1995), the Fiji Locally Managed Marine Area format and also the Department of Fisheries survey format. Households to be interviewed will be chosen based on their involvement in fishing activities. It is recommended to interview a minimum of 10% of all households within the selected district. This is to ensure that enough households are chosen to represent a general picture of the district. The households are selected randomly so there is no room for a bias in the data. Basic socioeconomic information to be gathered from the districts include: number of fishing households directly involved with fishing activities, number of men and women involved in fishing activities, methods of catching, time spent on fishing

activity, types of organisms caught, frequency of seafood consumed, the location of fish landings, and areas most commonly frequented for fishing.

Creel surveys will be conducted at the fish landings identified in the household surveys. Creel surveys are defined as the observation of fishing activities and the monitoring of the catches of fishermen and women (Rawlinson et al. 1995). This part of the research will establish the names (common and vernacular) of the organisms caught, number of organisms caught, the weight and sizes of the catch, as well as methods involved in the fishing activities.

D.) Implications

A socioeconomic survey of this nature will be invaluable as it will provide baseline data on the subsistence fishery resources of an isolated island community. The data collected will identify organisms caught and consumed, methods of fishing activities, members of the household involved in fishing activities and their roles, areas used as fishing grounds, frequency of fishing activity performed, and lengths of fishing trips. It will also be used to keep a record of traditional and cultural information on fishing and the resources that has previously never been focused on. The study is important as it will provide data to the community on its subsistence fishery resources as well as being used in making conservation and management strategy recommendations for island communities. It will be used as a capacity builder for members of the island community as they will also participate in the research. The selected community member will be present at the community meetings, assist in the household interviews, and also participate in the creel

surveys. This study is also significant in that a socioeconomic assessment of the subsistence fishery resources has never been conducted in Rotuma.

E.) Logistics

Travel to and from Rotuma Island can be complicated. This is mainly because of the distance, the island's isolation from the mainland and transportation problems. Currently, there is only one inter-island boat per month. However, three to four times per year, there is a scheduled government vessel to the island. Where possible, research visits will coincide with months where there are two boat trips to the island in the single month. When this is not possible, return travel to the mainland will be by air. The airport on Rotuma Island is currently under re-construction and this work should be completed by the end of the year, 2006. Therefore, the first trip to the island, scheduled for October 2006, will be on the inter-island boat and the return trip on the government boat. The budget includes air travel costs. However, return travel by air may not occur if there are two boat trips scheduled for the month of the scheduled research visit. Subsistence and accommodation on the island will be co-ordinated by *LajeRotuma* Initiative facilitators on the island. Where this is not possible, other arrangements will be made.

F.) Time Frame

February – June 2006: Completion of literature review

August 2006: Proposal submission

October 2006: First field visit to Rotuma Island

November 2006 – February 2007: Analysis of data

March 2007: Second field visit to Rotuma

April – June 2007: Analysis of data

July 2007: Third field visit to Rotuma

August – September 2007: Analysis of data

October 2007: Fourth field visit to Rotuma

November – February 2008: Analysis of data

March 2008: Possible final trip to Rotuma to present data to the community

August 2008: Submit first draft of thesis

G.) Literature Cited

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H.) Appendix

Appendix A

FISHING INTERVIEW SURVEY QUESTIONNAIRE

| SECTION 1: RESPONDENT'S IDENTIFICATION | | | |
|--|--|-------------|--------|
| 1. Interviewer | | 2. Code | |
| 3. Date | | 4. Time | |
| 5. Village | | 6. District | |
| 7. Respondent | | 8. Gender | M or F |
| 9. Age | | 10. Race | |

| SECTION 2: PERSONAL AND SOCIOECONOMIC | | | | | |
|---|--------|--|--|----------|----------|
| 1. Number permanently living in household | | | | | |
| 2. Composition of household: | | | | | |
| | Number | | Ages | | |
| Adult Male | | | | | |
| Adult Female | | | | | |
| Child Male | | | | | |
| Child Female | | | | | |
| 3. Household's Main Source of Income: | | Rank (1-5 in order of where most money is made from) | | Season | |
| Copra Farming | | | | | |
| Farming | | | | | |
| Wage Employment | | | | | |
| Other (please specify) | | | | | |
| | | | | | |
| | | | | | |
| 4. Members of the family who go fishing and how often do they make fishing trips? | | | | | |
| | Number | 3-7 times per week | 1-2 times per week | >1 month | <1 month |
| Adult Male | | | | | |
| Adult Female | | | | | |
| Child Male | | | | | |
| Child Female | | | | | |
| 5. Amount of fish caught by household, which is consumed by the household? | | | | | |
| All | | | | | |
| Some | | | | | |
| None | | | | | |
| 6. If not all, what about the rest? | | | Rank (1-5 in order of mostly used for) | | |
| Sold | | | | | |
| Given to family | | | | | |
| Given to friends | | | | | |
| Given to animals | | | | | |
| Other (Specify) | | | | | |

SECTION 3: FISHING METHODS

1. What are the main fishing methods used by the members of the household?

| | Rank | By Who | Usual Time | Moon Phase | J | F | M | A | M | J | J | A | S | O | N | D |
|-------------------------------------|------|--------|------------|------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Hand Line | | | | | | | | | | | | | | | | |
| <i>Sua ki</i> | | | | | | | | | | | | | | | | |
| Drop Line | | | | | | | | | | | | | | | | |
| Trolling | | | | | | | | | | | | | | | | |
| Gill Net (Set) | | | | | | | | | | | | | | | | |
| Gill Net (Drive) | | | | | | | | | | | | | | | | |
| Spear | | | | | | | | | | | | | | | | |
| Collection | | | | | | | | | | | | | | | | |
| <i>Duva/Fuha</i> (poisonfishing) | | | | | | | | | | | | | | | | |
| <i>Hagoat vao</i> | | | | | | | | | | | | | | | | |
| Fishing Pole (Bamboo) | | | | | | | | | | | | | | | | |
| Trap | | | | | | | | | | | | | | | | |
| Other | | | | | | | | | | | | | | | | |

2. What is the main hook bait used?

| | Rank (1-5 in order of most used) |
|---------------|----------------------------------|
| Crab | |
| Squid/Octopus | |
| Small Fish | |
| Larger Fish | |
| Other | |

3. Does anyone in your household use lights during any of their fishing operations?

If yes, give details? E.g. torch, burning dried coconut leaves

SECTION 4: FISHING ASSETS

| | | | |
|---|--------|------------------------|-----------|
| 1. Number possessed by household? | | | |
| | Number | Size (where specified) | |
| Hand Line | | N/A | |
| <i>Sua ki</i> | | N/A | |
| Drop Line | | N/A | |
| Spear (Gun) | | | |
| Spear (Hand) | | | |
| Diving Goggles | | N/A | |
| Fishing Pole (Bamboo) | | | |
| U/W Torch | | N/A | |
| Scuba Gear | | N/A | |
| Other | | | |
| 2. Number possessed by household? | | | |
| | Number | Boat Size | Engine HP |
| Paddle Canoe | | | |
| Marine Plywood Boat | | | |
| Fibreglass Boat | | | |
| Local Wooden Punt | | | |
| FAO Design | | | |
| Other | | | |
| 3. Number of iceboxes owned by household? | | | |
| | Number | | |
| Homemade Icebox | | | |
| Plastic Esky | | | |
| 4. Does your household use ice? | | | |
| Yes | | No | |
| If yes, from where? | | | |
| | | | |

SECTION 7: FISH CONSUMPTION

| | |
|---|--|
| 1. How often does your household consume fish? | |
| | Tick |
| Every day | |
| 4-6 times per week | |
| 1-3 times per week | |
| 1 time per week | |
| Never | |
| 2. What is the source of this fish? | |
| | Rank (1-5 in order of highest to lowest) |
| Own caught fish | |
| Bought fish | |
| Free fish | |
| Tinned fish | |
| Other | |
| 3. Where does the fish come from? Tick which ones apply | |
| <input type="checkbox"/> Distant Area: Outerlying islands <input type="checkbox"/> Fish Aggregating Device <input type="checkbox"/> Outside edge of outer reef <input type="checkbox"/> On outer reef <input type="checkbox"/> Inside lagoon (Deep) <input type="checkbox"/> Inside lagoon (Shallow) <input type="checkbox"/> Along shore <input type="checkbox"/> Other | |

I.) Detailed Budget

I. Travel Costs

First Trip To Rotuma – October 2006

Boat Travel

Suva – Rotuma – Suva x 1 x \$285 \$285

Land Transport

1 x 10 days x \$50/week \$75

Subtotal **\$360**

Second Trip To Rotuma – March 2007

Boat Travel

Suva – Rotuma – Suva x 1 x \$285 \$285

Land Transport

1 x 4 weeks x \$50/week \$200

Subtotal **\$485**

Third Trip To Rotuma – June/July 2007

Boat Travel

Suva – Rotuma – Suva x 1 x \$285 \$285

Land Transport

1 x 4 weeks x \$50/week \$200

Subtotal **\$485**

Fourth Trip To Rotuma – September 2007

Boat Travel

Suva – Rotuma – Suva x 1 x \$285 \$150

Air Travel

Rotuma – Suva x 1 x \$365 \$365

Land Transport

1 x 10 days x \$50/week \$75

Subtotal **\$590**

Fifth Trip To Rotuma – March 2008 (Community presentation)

| | |
|---------------------------|--------------|
| <i>Boat Travel</i> | |
| Suva – Rotuma x 1 x \$150 | \$150 |
| <i>Air Travel</i> | |
| Rotuma – Suva x 1 x \$365 | \$365 |
| <i>Land Transport</i> | |
| 1 x 10 days x \$50/week | \$75 |
| Subtotal | \$590 |

II. Subsistence and Accommodation

First Trip To Rotuma – October 2006

| | |
|------------------------|--------------|
| <i>Groceries</i> | |
| 1 x 10 days x \$20/day | \$200 |
| <i>Accommodation</i> | |
| 1 x \$35 | \$35 |
| Subtotal | \$235 |

Remaining Trips To Rotuma

| | |
|--------------------------|---------------|
| <i>Groceries</i> | |
| 1 x 80 days x \$20/day | \$1600 |
| <i>Accommodation</i> | |
| 1 x \$40/week x 10 weeks | \$400 |
| Subtotal | \$2000 |

III. Equipment and Consumables

| | |
|--------------------------------------|-------|
| Tape Measure x 10 x \$2 | \$20 |
| Measuring (Spring) Scale x 10 x \$10 | \$100 |
| Photocopy of data sheets | \$50 |
| Printing of thesis | \$100 |
| Binding of thesis | \$120 |

| | |
|-------------------|--------------|
| Interlibrary loan | \$100 |
| <hr/> | |
| Subtotal | \$490 |

IV. Research Support Staff

Throughout the trip there will be a community member present and if not, an LRI Island Facilitator to accompany the student to assist in the research, especially for modes of communication as translator. To participate in the household interviews and help interpret at the sites of the fish landings.

| | |
|---|---------------|
| Local Community Guide 1 x \$20/day x 60 days | \$1200 |
| <hr/> | |
| Subtotal | \$1200 |

| | |
|----------------------|---------------|
| <hr/> | |
| Overall Total | \$6435 |
| <hr/> | |