

A Socio-economic Profile of Fisheries in the Grenadines

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ABSTRACT

For proper and effective fisheries management, there is a need to understand not only the biophysical environment but also the demographic and socio-economic aspects. From June to August 2006, students from the Centre for Resource Management and Environmental Studies (CERMES) conducted a trans-boundary socio-economic and livelihood assessment of fisheries in the Grenadines. The study was divided into two stages and took place in the Vincentian islands of Bequia, Mustique, Canouan, Mayreau and Union Island and the Grenadian islands of Petit Martinique and Carriacou. The first stage created a basic demographic profile of the fishers and gathered data on their gear and resource-use patterns. This was done through interviews of 267 fishers from all of the major fishing villages in the Grenadines. The second stage created a more detailed socio-economic profile of the fisheries. This involved acquiring more data on temporal and spatial features of fishing practices, and information on market orientation, income, expenditures and material style of life from a sub-sample of these fishers. Over 75% of the fishers in the study relied on fishing as their major source of income. Less than half had an alternative livelihood and many continued to fish well beyond retirement age. This suggests vulnerability within the fishing community, especially within the older population. Shallow-shelf demersals are the most important species group and also the most overexploited. Governments should encourage fishers into alternative fisheries and livelihoods through market incentives, training and loans. The information from this study will help resource managers and users better understand the socio-economics of the fisheries and may lead to more informed decision making for sustainable fisheries in the Grenadines.

KEYWORDS: fisheries, Grenadines, socio-economic

Un perfil socio-economico de la pesca en las Granadinas

Para el manejo apropiado y efectivo de la pesca, se hace necesario comprender no solo su ambiente biofísico sino también su demografía y aspectos socio-económicos. Desde Junio a Agosto 2006, estudiantes del Centro de Manejo de Recursos Naturales y Estudios Ambientales (CERMES) realizaron una evaluación de subsistencia y socio-economía transfronteriza de la pesca en las Granadinas. El estudio estuvo dividida en dos fases y fue llevado a cabo en las islas de San Vicente: Bequia, Mustique, Canouan, Mayreau y Union Island y las islas Granadinas: Petit Martinique y Carriacou. La primera fase creó un perfil demográfico básico de los pescadores y recopiló datos sobre sus aparejos y patrones de uso del recurso. Esto fue realizado a través entrevistas a 267 pescadores en todas las mayores comunidades pesqueras en las Granadinas. La segunda fase, creó un perfil socio-económico mas detallado de la pesca. Esto involucró la adquisición de más datos sobre detalles de prácticas de pesca temporal y características espaciales e información sobre la orientación del mercado, ingreso, gastos y estilo de vida material de los pescadores. Más de 75% de los pescadores considerados en este estudio dependen de la pesca como su mayor fuente de ingreso. Menos de la mitad posee alternativa de subsistencia y muchos continúan pescando aun pasada la edad de jubilación. Esto sugiere una vulnerabilidad dentro de la comunidad pesquera, especialmente dentro del grupo de mayor edad. Los demersales de plataforma de menor profundidad son el grupo de especies mas importantes e igualmente los mas sobre explotados. Los gobiernos deben incentivar en los pescadores a buscar pesca y subsistencia alternativa a través de incentivos de mercado, capacitación y préstamos. La información de este estudio permitirá a los administradores y usuarios del recurso una mejor comprensión de la socio-economía de la pesca y pueda ser que guíe a una toma de decisión más sostenible e informada para la pesca sostenible en las Granadinas.

PALABRAS CLAVES: demografía, pesca, Granadinas, socio-economía

INTRODUCTION

The Grenadine islands are situated on an extensive shallow shelf area with many reef systems, mangroves and seagrass beds that provide habitat for a wide diversity of marine plants and animals. Three quarters of the Grenadine bank is less than 50 m deep allowing for extensive coral reef formation (CCA/IRF 1991) and a productive fishing area. There are 9 inhabited islands, 7 of which belong to St. Vincent (Bequia, Mustique, Canouan, Mayreau, Union Island, Petite St. Vincent) and the remaining two to Gre-

nada (Petite Martinique, Carriacou). In the Grenadines, marine resources play vital roles in food security, sustaining livelihoods and cultural and social activities. As the land in the Grenadines is not very productive for agriculture (Jardine & Straker 2003), many make their living from fishing. In previous times, this industry was one of the few options for employment, especially after the Second World War (Mohammed *et al.* 2003). Even to this day, fishing is one of the main economic activities on islands such as Pe-

tite Martinique (Logan 2001).

Demersal species remained the most important in the second half of the last century. Demersal finfish were mainly caught using handlines in small bow and stern vessels with a small crew (3-6). Other important species included lobster, conch, sea urchins whereas on the "mainlands" (i.e. St. Vincent and Grenada) coastal and offshore pelagics were respectively the most targeted species. The use of fish pots and mechanization of the pelagic fleet in Grenada began to spread to its smaller islands (Mohammed and Rennie 2003). Indication of overexploitation of many species became evident in the 1980s. Low abundance of shallow water fishes and smaller sized lobsters, increased fishing effort (scuba and faster boats) and deeper fishing for demersals all testified that overfishing was occurring, especially in the shallower waters (Mohammed and Rennie 2003). However, managers recognised that demersals on deeper banks and offshore pelagics could withstand increased effort, and attempts have been made by both governments to encourage these fisheries.

Resource management involves balancing conservation with sustainable use (Bunce & Pomeroy 2003). Resource users have an immense impact on the environment and are the most vulnerable to its degradation. Managers therefore have to understand resource use patterns and the

socio-economic factors that act upon them (CFRM 2004). Stakeholder interaction and information gathering enhance local participation in management and increase the chance of further participation in conservation activities (Walters *et al.* 1998).

Through interviews with members of the fishing community, this study seeks to create a socio-economic profile of fishers in the Grenadines. Decision makers can combine biophysical and socio-economic data to better understand the coastal environmental and the human interactions and uses that affect it. This information will help to identify coastal areas that may be at risk of overexploitation and to design appropriate conservation strategies that will not threaten the livelihoods of fishers. It will also aid managers in recognising the vulnerability of the fishermen to natural and anthropogenic shocks (e.g. hurricanes, market fluctuations, increased oil prices etc) and to build resilience through informed decision making.

The information collected in this MSc research project will supplement the ongoing conservation work of the Sustainable Grenadines Project (SusGren) and Marine Space-use Information System (MarSiS). MarSiS is a computerised Geographic Information System (GIS) which is being created to amalgamate social, economic, cultural and biophysical resource information & policy to assist resource

Table 1. List of Socio economic variables used in the study.

Socioeconomic Category	Variable Code	Socio-Economic Variable	Phase
Community Level Demographics	K1	Study Area	Sec. Data Assess.
	K2	Population	Sec. Data Assess.
	S1	Age	I
	S2	Gender	I
	S4	Education	II
	S3	Ethnicity	II
	S5	Religion	II
	S7	Occupation	I,II
	S9	Household Income	II
	S10	Household Activities	II
Coastal & Marine Activities	K14	Activities	I,II
	K15	Goods and Services	I,II
	K16	Value of Goods and Services	II
	K17	Goods and Services Market Orientation	II
	K18	Use Patterns	I,II
Material Style of Life	S28	Material Style of Life	II
Other		Boat Painting and Engine Servicing	II
		Boat Cleaning	II

managers in effective coastal management (Baldwin 2006). It will identify critical habitats and areas of concern and conflict amongst marine resource users. This project aims to combine scientific data with local ecological knowledge to fill information gaps, promote participation and highlight policy decisions and concerns that should take precedence. SusGren seeks to build capacity through partnerships with other civil society organisations and stakeholders by providing them with tools to be more actively involved in managing the resources that they depend so heavily on. The information from this study will help to create an understanding of the socio-economic characteristics of fishers which is essential to aid SusGren in fulfilling its mandate of promoting sustainable livelihoods.

METHODS

A modification of the *SocMon Caribbean* methodology (Bunce & Pomeroy 2003) was used in this research project. The study did not employ all *SocMon Caribbean* methods as it was a stand-alone assessment rather than explicitly the initiation of a monitoring programme. During the months of January to June 2006, Ms. Kimberly Baldwin of the Centre for Resource Management and Environmental Studies (CERMES) conducted an initial scoping of the marine resource users of the Grenadines (Baldwin 2006). This involved secondary data collection, interviews with key informants and other stakeholders and general observation of the study area. Concurrently, the secondary data assessment and scoping for this project were also conducted and the data were compiled so as to identify the information gaps required to complete the MarSIS database. Based on the gaps identified, the objectives of this study were formulated and the *SocMon* variables that were to be utilised in this study were selected (see Table 1). The field study took place from June to August 2006 on the 7 inhabited islands of the Vincentian and Grenada Grenadines with permanent fishing villages. Phase I involved visiting the major fishing communities and interviewing all the fishers encountered with a simple, one page questionnaire. Due to time and resource limitations and the absence of part-time lobster fishers, a census could not be conducted and a non-random sample of 267 fishers was obtained. This questionnaire was designed to capture basic demographic information and resource use patterns. Phase II utilized a more in-depth structured interview process to gather more detailed demographic information, resource use patterns and market attributes from a purposive subsample of Phase I fishers and some new respondents in which most types of fishing were represented. The data were recorded and analyzed using Microsoft Excel 2003 and Statistical Package for Social Sciences (SPSS) version 11.

RESULTS

Demographic Information

During both phases of the study all but one of the respon-

dents were male. The average age of fishers was 45 years (Figure 1), and they had fished for an average of 23 years. The predominant religion was Roman Catholic followed by Anglican and Pentecostal. Roman Catholics dominated islands such as Mayreau and Petite Martinique where all of the respondents were members of that religious group. Six-

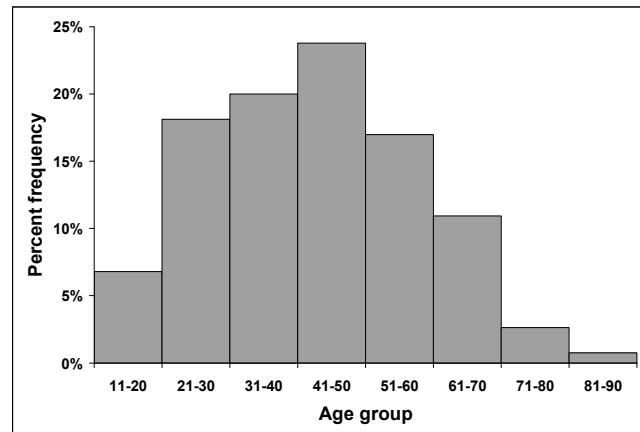


Figure 1. Age distribution of fishers sampled during the in-depth survey

Education

The majority of fishers had primary education with only 32% reporting secondary or post-secondary education. In Bequia there was some difficulty in assessing the level of education of the fishers since many attended a government 'primary' school until they were 15 years old. Therefore, the data from this island were excluded from the analysis. However, the only fisher in this survey to attend a technical learning institution was from Bequia. Secondary education is not available on every island (e.g. not in Mayreau, Petite Martinique) and parents have to send their children to school by boat to other islands. Most of the secondary schools in the Grenadines were recently established, so it would have been more difficult for fishers thirty years ago to obtain secondary education. Even now access to this level of education is difficult. One Petite Martinique fisher described the great financial burden of having to send his children to Carriacou each day by boat so that they can attend secondary school. Some also said that due to financial problems within the household they were required to enter the workforce (i.e. fishing) at a young age. One of the fishers stated that even now fishers lack access to tertiary education. He believes that this lack of access is a limitation to fishers being able to better sustain themselves with regards to fishing and to managing their money effectively.

Household Information

One third of the fishers surveyed were married and 58% were either single or had a common-law partner. For the fishers who provided information (n=14) on dependents

in the household (even though it was not asked in the survey), the number of dependents was on average 5.6 and ranged from 2-9 children. Eighty percent of the fishers were the heads of their households and on average there was one other person in the house who also had a regular source of income. Over 75% of fishers interviewed made the majority of their income from fishing. Only 9 of the 64 respondents (14%) stated that they lived in a household with another fisher.

Material Style of Life

Fifty-five percent of the interviewees owned the house they lived in and half owned the land that their house was upon. All houses have galvanised roofs and majority of the outer structures are concrete walls (58%). The predominant flooring type is cement (55%) followed by wood. Information was collected on select household items during the interview and Figure 2 shows the percentage of respondents possessing various household items.

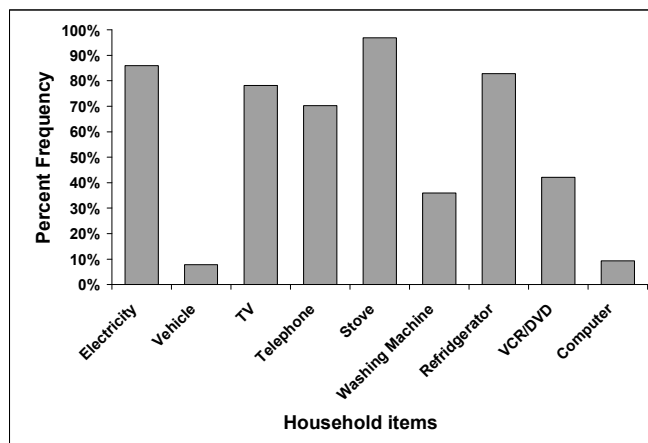


Figure 2. Percent frequency of household items of fishers interviewed during the in-depth survey.

Almost all of the fishers had a stove and over 70% had electricity, television, telephone and refrigerator (Figure 2). Vehicles were not practical as the islands were small and many used or shared boats and vehicles as their means of transport. Most of the fishers with vehicles were found in Carriacou and Bequia (the largest of the islands). As a result of the water scarcity on many of the islands, washing machines were not frequently used, especially in the Vincentian Grenadines. Computers were also not very popular household items and almost all were found in the Grenada Grenadines. Overall, from the data collected, the fishers in the Grenadines appear to have a quite comfortable standard of living.

Resource Use Patterns

Demersal finfish are the most targeted species group (Figure 3) and are fished using a variety of techniques (Figure 4). These are (in order of usage): handlining, spear-

fishing with or without scuba, traps and sinking palang/ bottom longlining. This resulted in a range of catch sizes and effort. Trap fishers would usually fish only 3-4 times a week for about 2-3 hours whereas handliners would sometimes fish up to 9 hours a day, 6 days a week. A common catch and effort would be 14-23 kg of fish when fishers leave around 5-6 am and return around 11am-12pm.

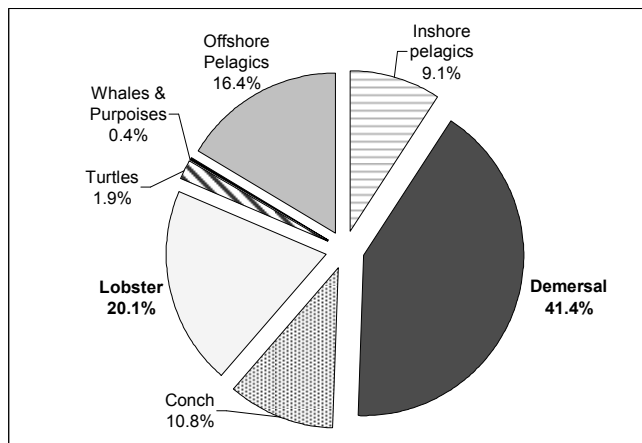


Figure 3. Percent frequency of fishers targeting select species groups.

Over half of the lobster fishers interviewed used traps followed by 32% using scuba. The Vincentian government has been promoting the use of traps to reduce the amount of dive injuries from lobster fishing with scuba which is usually caught using a loop to hook around the lobster. Other techniques not as commonly used were freediving, trammel net and gill nets. Gill nets are left for an extended period of time on the reef and it traps fish which die and rot in the net. This scent attracts the lobsters and they climb and get entangled in the net trying to reach the fish.

Due to the multiplicity of the types of fishing employed, it was difficult to determine the average fishing intensity by type. However, from informal interviews with the fishers, it seems as if trap fishing averages about 3-4 trips per week, handlining, spear, scuba, bottomlining, towing, palang and seine about 6 days a week and surface longlining from 1-3 trips (this varies with length of trip which can be up to 2 weeks on larger vessels).

Figure 5 shows the average catch for each species group. However, fishers expressed great difficulty in determining their average catch. Fishers would state what a "good fishing day's catch" and a "bad fishing day's catch" would be and then an estimation between that figure would be created. As such, this data was not combined with other variables to be used in further analysis such as: total landings, average annual catch, average catch by fishing ground and average gross earnings per species. An expected bias would be that fishers would understate their catch so as to give an opinion of less earnings. The opposite was also

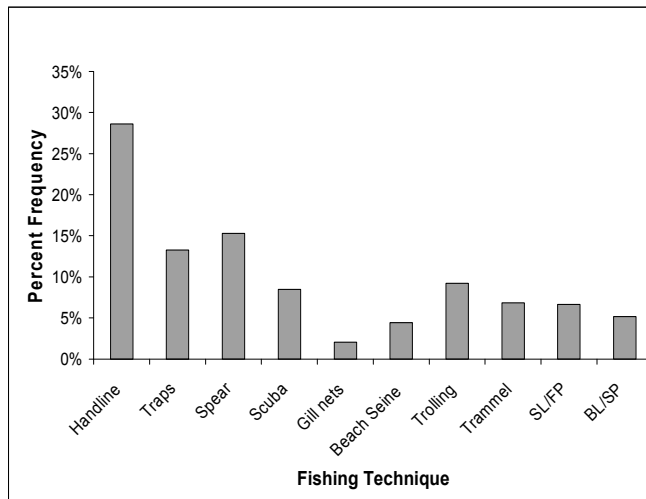


Figure 4. Percent frequency of fishing techniques employed by the interviewed fishers (SL/FP-Surface Longlining/Floating Palang, BL/SP- Bottom Longlining/Sinking

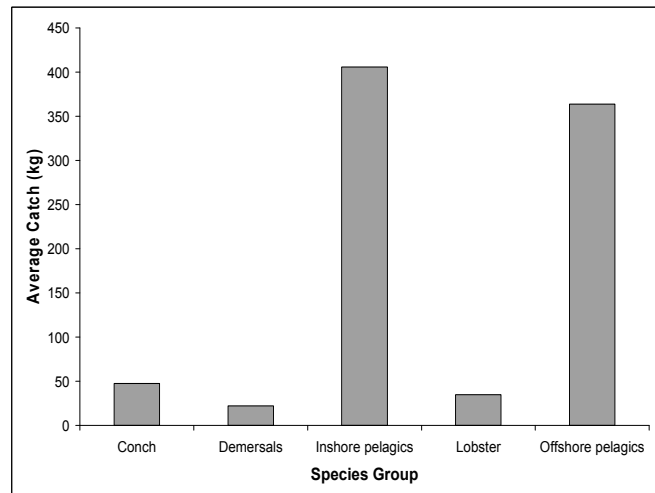


Figure 5. Average catch of fishers in the Grenadines by species group

observed where fishers drastically overstated their catch, possibly to give a better impression of their fishing skills. Information that was obviously misleading or was completely contrary with the information from key informants was discarded (i.e. data from two in-depth surveys). Also, the information was validated during the community workshops and fishers generally agreed with the data except for the catch values of inshore pelagics which they believed was too high.

The average fishing trip (in hours) given for each species group was measured from the time of leaving the mooring/dock to the time of landing. This was a rough estimate and trips reported for some target species were relatively similar (e.g. demersals) and while others varied greatly in duration (e.g. offshore pelagics). Again it was difficult to isolate the hours fished by type of fishing as fishers used more than one technique to capture the same species on a single trip. To gather this information would have made the interview process too complicated as the fishers had already showed difficulty in giving adequate detail for the current survey.

Market Information

Almost 50% of the respondents sell their fish to trading vessels for export. In islands such as Mayreau all the interviewed fishers sold to trading vessels. This shows that trading vessels (and subsequently the export market) play a vital role in sustaining the livelihoods of fishers in the Grenadines. These vessels transport the fish to other islands such as Martinique. About half of the fishers also land their fish on shore either in their base island or in other islands. One third of the respondents sold to purchasing groups (i.e. Canouan Fisheries, Mustique Company, vendors in Kingstown, government). These markets seem

to be chosen because of their proximity to the fishing operations; that is, about all the fishers in Mustique sell to the Mustique Company and fishers who sell fish to the St. Vincent vendors are from the northern Grenadines.

The average price for demersals is EC \$11.79 per kg and is the most commonly caught and sold fish group. More than half is sold to trading vessels, followed by approximately ¼ selling their catch on shore (Figure 6). Fishers get a higher price for demersals on shore (EC \$13.20-15.40 per kg) than on the trading vessels (EC \$10 per kg).

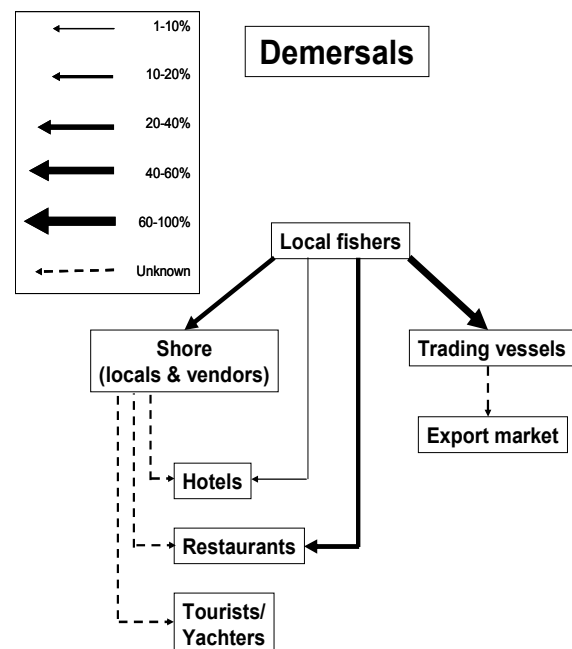


Figure 6. Customer preference of demersal fishers in the Grenadines

However, fishers prefer to sell to the trading vessels as they are more reliable buyers. Snapper receives a higher price (EC \$11 per kg) than other demersal species on the trading vessels. Very few fishers stated that they sell to tourists, even to local restaurants. This may not be the case as it was observed that quite a few restaurant workers greet the vessels on shore and take the fish back to the restaurants.

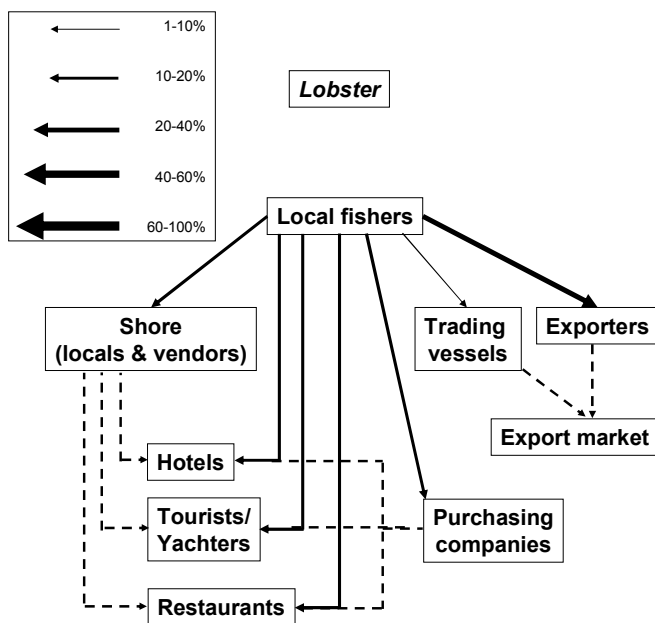


Figure 7. Customer preference of lobster fishers in the Grenadines

Although lobster is the second most traded species on the market, it holds the highest sale value. The average price for lobster is EC \$24.65 per kg. However, this is not consistent for the entire season as it is often sold at EC \$22 per kg at the beginning of the season and sometimes up to EC \$30.80 per kg at the end when landings become scarce. Some fishers therefore do not enter the fishery till later in the season when profits are higher. Few of the respondents stated that they sell directly to tourists on shore or to yachts. Lobster is sold to yachts and other tourists at a higher price (up to EC \$44 per kg). Almost half of the respondents say they sell lobster for export to Barbados and/or Trinidad (Figure 7) at around EC \$22-\$26.40 per kg. Other export destinations include the United States and Martinique. Many restaurants and businesses (e.g. Mustique Company) buy lobsters to sell to tourists on shore or onboard yachts.

DISCUSSION

The fishing industry in the Grenadines involves a wide age spectrum (teens-80s) and the general standard of living appears to be quite well. The shallow-shelf demersal fishery, which the majority of fishers depend on, is severely overexploited (Food and Agriculture Organization 2000)

and this creates a vulnerability within the sector. The demersal, lobster and offshore pelagic fisheries all rely heavily on export markets and indicate that the Grenadine fishery is demand-driven.

This study highlights major issues and vulnerability within Grenadines fisheries, especially the dependency on overexploited species and export markets. Comprehensive studies should be conducted to ascertain the status of the fished stocks on the Grenadine shelf and the market forces that drive the industry. With this information, managers can use market forces to guide the industry away from these overexploited species by identifying and possibly by creating new markets for less exploited species. Also, fishers should be trained in fishing techniques for these less exploited but marketable species.

Exports to Martinique (through the trading vessels) represent a large proportion of sales of Grenadine fishers and are thus a major income source for fishers. It is therefore imperative that the government of St. Vincent & the Grenadines work to ensure that they improve the infrastructure of the markets so as to meet the European Union standards so that they can export to this country. However, caution must be exercised as this may encourage more to rely on the overfished demersal stocks. In the Vincentian Grenadines, a large proportion of fishers believe that supply exceeds demand in the local market. Many fishers complain that they are unable to sell all of their catch which leads to the spoiling of fish in some cases, and that the earnings from a day of fishing are too little. The marketing of offshore pelagics from the Vincentian Grenadines is a potential option with sustainable harvesting being one of the key fundamentals of the fishery and marketing planning.

Fishers in the Vincentian Grenadines complain of barely being able to survive financially due to lack of government support. Despite this, fishers in all of the islands appear to have a reasonably good standard of living. In the Grenada Grenadines the standard of living appears to be higher. This may be due to the additional support received from the government or to the fact that more economic activity occurs in islands such as Carriacou, and may not be a reflection only of the fishing industry.

Bilateral coordination between the Grenada and St. Vincent governments is imperative for managing shared resources. Due to the trans-boundary nature of the fisheries, management decisions made and policies created by one government will impact on those of the other government. Therefore, bilateral coordination and the sharing of information and management tools would drastically improve the effectiveness of management. Many of the efforts of the Grenada government to improve their fisheries were well executed and these can be replicated by the Vincentian government. Policy makers in both governments should examine carefully how fishers exploit the resource, what tools they have available to them and the threats and opportunities that affect their livelihoods before making important decisions. This is vital in order to reduce the vulnerability

of the fishermen to natural and anthropogenic shocks (e.g. hurricanes, loss of boats, increased oil prices, etc.) and to ensure that the industry moves forward sustainably.

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