

## **A livelihoods analysis of Fishers in the Grenadines**

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### **ABSTRACT**

Fishing is a primary economic and social activity in the Grenadine Islands. In order to obtain a sound understanding of both biological and human factors associated with the exploitation of marine and coastal resources, a livelihoods analysis of fishers was conducted. The first phase of the study involved an initial inventory to (1) identify the fishers of Bequia, Mustique, Canouan, Mayreau, Union, Petit Martinique, and Carriacou, (2) determine what types of fishing they do, (3) document the types of fishing vessels and gears that are used, and (4) obtain preliminary information on the locations of fishing hot spots. The second phase involved an in-depth survey which focussed on livelihood assets (human, natural, physical, financial and social capital), strategies and vulnerabilities that fishermen both utilize and face. Results show that over 60% of the fishers interviewed are solely dependent on fishing. Those that are involved in multi-occupational livelihoods have chosen additional means of earning an income because fishing, by itself, can not sustain them or their families throughout the year. Declining fish abundance, lack of government support and the need for a fisherman's co-operative are key concerns that were also expressed. The goal of this study is to provide relevant organizations and persons with a basis of information that can contribute to improving the effectiveness of decision making, interventions, and organization with respect to the management of fisheries and other marine resources. The qualitative information obtained from this livelihoods analysis can be used as a common ground for working with fishers to achieve sustainable development and utilization of marine resources within the Grenadines.

KEY WORDS: fishing, Grenadines, livelihoods, marine resources, sustainable development

### **Un análisis de subsistencia de los Pescadores de las Granadinas**

La pesca es la principal actividad económica y social en las Islas Granadinas. A fin de obtener una comprensión más profunda de los factores tanto biológicos como humanos asociados con la explotación de los recursos marinos y costeros, se condujo un análisis de subsistencia de los pescadores. La primera fase de este estudio involucró un inventario inicial para (1) identificar pescadores de Bequia, Mustique, Canouan, Mayreau, Unión, Petit Martinique, y Carriacou, (2) determinar tipos de pesca que realizan, (3) documentar los tipos de barcos y aperos de pesca que se utiliza, y (4) obtener información preliminar de las locaciones de los principales puntos de pesca. La segunda fase involucró una encuesta a profundidad enfocado en bienes de subsistencia (humano, natural, físico, financiero y capital social), estrategias y vulnerabilidades que los pescadores a la vez utilizan y enfrentan. Los resultados muestran que más del 60% de los pescadores entrevistados dependen exclusivamente de la pesca. Los que están involucrados en subsistencia multi-ocupacional han seleccionado medios adicionales de ingreso ya que, la pesca, por si sola, no puede sostenerlos a ellos o a sus familias a lo largo del año. La declinante abundancia de la pesca, falta de apoyo gubernamental y la necesidad de una cooperativa de pescadores fueron las principales preocupaciones expresadas. La meta de este estudio es proveer a las organizaciones relevantes y personas con una base de información que pueda contribuir a mejorar la efectividad de la toma de decisión, intervenciones, y organización con respecto al manejo de la pesca y otros recursos marinos. La información cualitativa obtenida de este análisis de subsistencia puede utilizarse como una base común para el trabajo con los pescadores a fin de lograr un desarrollo sostenible y utilización de los recursos marinos dentro de las Granadinas.

PALABRAS CLAVES: Pesca, Granadinas, subsistencia, recursos marinos, desarrollo sostenible

### **INTRODUCTION**

The Grenadines of the Windward Caribbean islands are located between mainland St. Vincent in the north and Grenada in the south. This cluster of approximately 600 islands, islets and cays lie atop the 3,000 km<sup>2</sup> Grenada Bank and extend for almost 96 km between the two sovereign nations. Seven of the inhabited Grenadine islands (Bequia, Mustique, Canouan, Mayreau, Union, Palm, and Petit St. Vincent) belong to St. Vincent and the Grenadines, while the remaining two (Carriacou and Petit Martinique) are a part of Grenada. (Baldwin 2006). The unique coastal and marine environments of the Grenadines provide good

conditions for tourism and fishing activities – two of the major contributors towards social and economic activities in the area. The fishing industry provides employment opportunities, income generation, sources of nutrition for local consumption, and commodities for international trade.

Fishing in the Grenadines is small-scale and artisanal, focussed primarily on shallow-shelf and deep-slope demersals, lobster and conch. A variety of gear and techniques are utilized in the islands, including handlining, pots/traps and spear fishing, which are primarily carried out in traditional speed boats. This is in contrast to the St. Vincent and

Grenada main-lands where offshore and inshore pelagics are the most commonly targeted species via trolling and longlining, and seine fishing respectively. Increased fishing effort and a lack of enforcement and proper management has lead to the decline in abundance observed in the shallow-shelf demersals of the Grenadines. It is therefore possible to expand the fishery towards deep-slope demersals and offshore pelagics which are considered to be underexploited; however sustainable management of these fisheries is essential in order to prevent overexploitation (Chakalall *et al* 1994).

The people of the Grenadines are significantly dependent on their coastal resources for sustenance. It is therefore critical to have an understanding of not only biological, but also economic and social factors, in order to manage the fishery in a sustainable and efficient manner. The aim of this study is to provide governments, non-governmental organizations (NGOs), and the people of the Grenadines with basic information that can contribute towards improving the effectiveness of decision making, interventions and organization with respect to the management of fisheries and other marine resources. To achieve this aim a livelihoods analysis of the Grenadine fishers was conducted.

According to the Department for International Development (DFID) “[a] livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living (1999).” Based on this knowledge a livelihoods analysis of fishers in the Grenadines can help design appropriate inputs and priorities that are required for the management of this small-scale, yet diverse fishery. Results of this study will also contribute to the Sustainable Grenadines Project (SGP) and the Marine Space-use Information System (MarSIS), which respectively are aimed at achieving sustainable development and compiling spatial information of coastal re-

sources and their users within the island chain. Furthermore, the qualitative information obtained from this livelihoods analysis can be used as a common ground for working with fishers in a participatory manner, to achieve sustainable utilization of marine resources within the Grenadines

**METHODOLOGY**

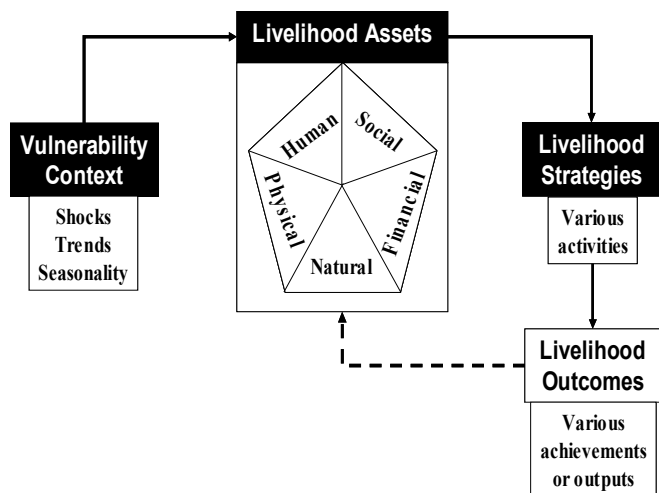
The livelihoods analysis was based on a two-phased approach and conducted in the major fishing communities on the islands of Bequia, Mustique, Canouan, Mayreau Union, Petite Martinique and Carriacou. The first phase involved an initial survey of fishers to obtain the following information: basic demographics, fishing practices, operations, fish and vessel type, fishing locations and also contact information. The in-depth survey carried out in Phase II focussed on three main elements that comprise the livelihoods analysis and are presented in Figure 1: the vulnerability context, livelihood assets (human, social, natural, physical and financial capitals) and livelihood strategies of fishers in the Grenadines.

**RESULTS AND DISCUSSION**

Fishing in the Grenadines is a male-dominated occupation as only one female out of 267 fishers encountered in Phase I was a fisher-woman. The majority of these fishers were found on the larger islands of Bequia and Carriacou and the average age of fishers throughout the islands was 43 years. With the information obtained in the initial survey, a sample of 26 fishers was chosen for interviews in Phase II. A range of ages, dependency on fishing and ownership of fishing vessels were obtained for the in-depth livelihoods analysis of this study.

**Vulnerability Context**

“The [v]ulnerability [c]ontext frames the external environment to which people exist (DFID 1999).” Individuals have little control over external factors such as price trends,



**Figure 1.** Flow chart of the elements of a livelihoods analysis focussed on in this study

**Table 1.** Table showing average abundance of fish groups 5 years ago, and today (relative to 10 years ago)

Fish group	Abundance 5 years ago	Abundance today
Inshore pelagics	Same	Low
Demersals	Low	Low
Conch	Low	Very low
Lobster	Low	Low
Turtles	Low	Very low
Offshore pelagics	Low	Low

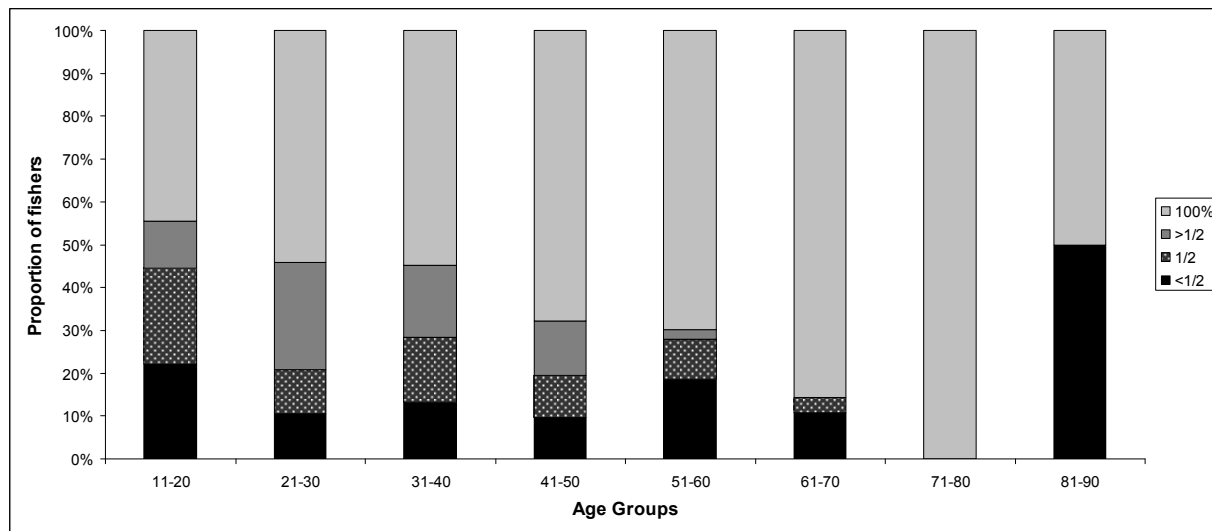


Figure 2. Dependency on fishing by age group (n=267)

seasonality of fish species, and the shocks brought on by natural phenomenon which have a great impact on the status of their livelihood assets.

One of the primary customers of fish caught in the Grenadines is the island of French Martinique who has a great demand for the shallow-shelf demersal fish species such as grunts, parrotfish, and hinds etc. This not only increases the fishing pressure on these overexploited species, but the Grenadine fishers are highly dependant on this foreign export market.

A strong correlation between age and sole dependency on fishing was also found for fishers in the Grenadines. "Sole dependency" refers to the fact that 100% of a per-

son's income is derived from fishing. A Mann-Whitney test showed that the difference between the mean age of fishers who are solely dependent on fishing (45 years) is significantly less than the mean age of fishers who are not (38 years) ( $Z=-4.118, n=254, p=0.000$ ). The bar graph in Figure 2 shows the dependency on fishing within the different age groups and demonstrates a positive relationship, where sole dependency on fishing increases with age.

These results indicate a considerable vulnerability within the Grenadines fishery where fishers are becoming more dependent on fishing with age. This could be due to the following factors: (1) the older generation were traditionally more dependent on fishing as there were fewer alternatives in the past, (2) with the gradual growth in the economy and job market, younger fishers have more opportunities and (3) as fishers get older, they are unable to adopt new skills to pursue other trades and thus, remain or

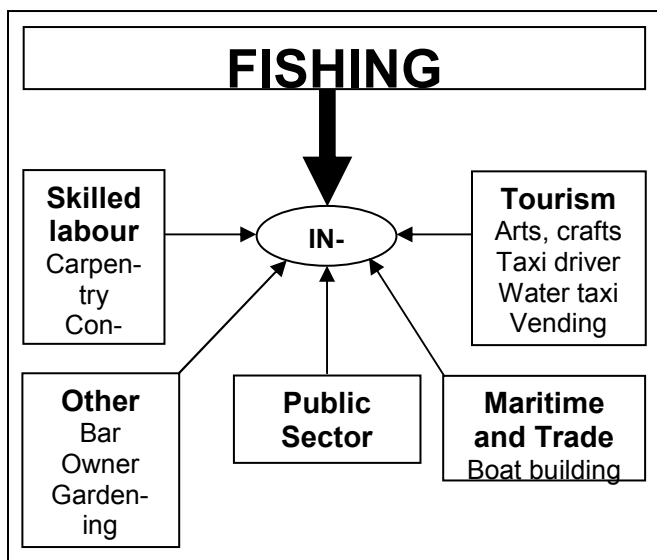


Figure 3. Diagram showing the main income earning activities identified by part-time fishers in the Grenadines

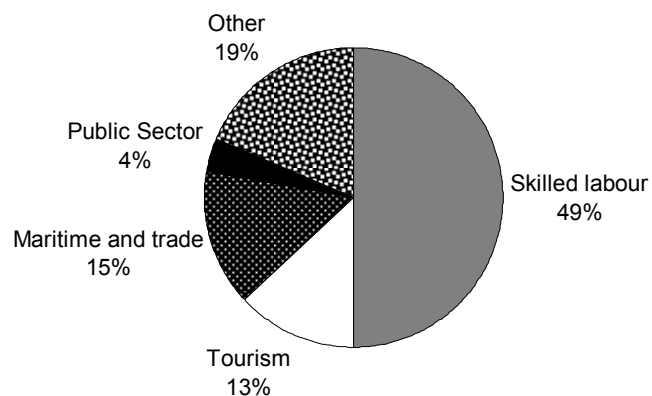


Figure 4. Main occupations of part-time fishers in the Grenadines (n=54)

turn to fishing.

The fishers' perception of the threats to their own livelihoods was also essential in this analysis. The majority of fishers interviewed in Phase II (39%, n=26) stated that the only reason they would stop fishing is bad health or even death. Other external factors such as bad weather (17%, n=26), increases in oil and gas prices (21%, n=26) and the lack of a stable market (10%, n=26) were also important threats to fishing livelihoods. An interesting finding was that few fishers (3%, n=26) felt that the reduction in fish abundance would force them out of the industry. It is clear that these men and woman are very dedicated to their trade if one of the major factors driving them away from fishing is their own inability to do so. Other answers (10%, n=26) included leaving the island or finding another means of earning an income.

An important aspect of the vulnerability context is determining how fishers cope with the external factors that impact their livelihoods. An alarming finding from this study was that 76% of the fishers (n=26) do not have any form of insurance in order to reduce the risk to their livelihoods. Only three of the six car owners have car insurance, while three persons have employment, house or life insurance respectively.

#### Livelihood Assets

Livelihood assets are required in order to achieve certain livelihood outcomes. They are both created and destroyed by external factors contributing to the vulnerability context, and those with greater assets tend to have more

options and opportunities to switch between multiple strategies in order to sustain their livelihoods (DFID 1999).

#### Human Capital

"Human capital represents the skills, knowledge, ability to labour and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives" (DFID 1999), and is required in order to make use of the other four assets.

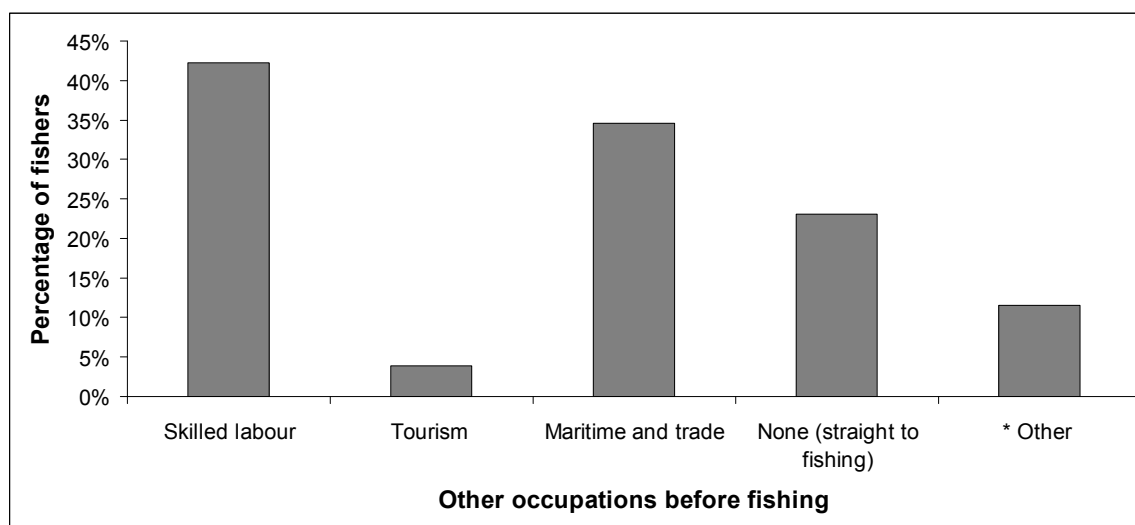
This livelihoods analysis of Grenadine fishers aimed to assess the longevity associated with fishing, or the passing on of invaluable skills and traditional knowledge. It was discovered that the majority of fishers (58%, n=26) were taught the skills and biology of fishing primarily by family members. Others were taught by friends and older members of the community (19%, n=26), and there were those who claimed to have learned to fish on their own (23%, n=26) through observation and trial and error. The majority

**Table 3.** Table showing the share system for catch earnings in the Grenadines

Item	Number of shares
1. Boat	1 share
2. Engine	1 share or ½ share
3. Boat + Engine	1 share
4. Crew	1 share each

**Table 2.** Table describing the facilities needed by fishers in each island

Island	Facilities needed by fishers
Bequia (Paget Farm)	Gas station Repair facility nearby Additional space for hauling boats
Mustique	Jetty and secure ramp for hauling boats (boats are currently getting damaged by conch shells on the beach)
Union Island	Gas station on the island (currently gas is purchased in PM or Canouan for \$9.50/gallon and sold by variety stores at \$12/gallon) Proper ramp and locker facilities for gas tanks and gear
Mayreau	Ramp and small complex to sell ice and gas
Canouan	Storage facility needs to operate properly Proper market or shelter to sell fish to locals (not a table on the side of the road)
Carriacou	Gas station closer to fishing villages Proper ramp for hauling boats Locker facility for tanks and gear Building to sell and store fish
Petite Martinique	Gas station for fishermen Storage facility for fish



**Figure 5.** Previous occupations of fishers in the Grenadines (n=26), \* Other occupations include bus driving, working in a store and gardening

of these fishers (85%, n=26) have also passed on their knowledge in this trade to friends and family members. 65% of respondents (n=26) have one or more family members who also fishes for their livelihood. These results are evidence of the continuation of fishing throughout the generations in the Grenadines. The tradition has carried on through the years and it is likely that it will continue to do so in the future.

Post-primary education amongst fishers in the Grenadines is lacking as only 23% of respondents (n=26) were educated beyond primary school. This is strongly linked to the fact that many islands simply do not or did not have access to secondary education as these schools were located on the mainlands. Not only was it expensive to attend secondary school, but after the completion of primary school around the age of 15, fishing was in many cases the only means of earning an income to provide for one's family.

This study also sought to establish what additional training fishers believe they require in order to make more efficient use of their skills and trade. It was discovered that fishers in the Grenadines are very keen on expanding their fishing activities as 85% of respondents (n=26) requested training in longline fishing. This interest in deep-sea fishing which targets offshore pelagics indicates that fishers are realizing the linkages between an increased effort that is necessary to catch shallow-shelf demersals due to their decline in abundance.

### Social Capital

Social capital refers to the "social resources upon which people draw in pursuit of their livelihood objectives" (DFID 1999). Social networks are created from the community level to the household level, increasing the intensity of trust between individuals and thus reducing

their costs of working together.

This livelihoods analysis aimed to determine the roles that fishers play in their communities by determining how they interact with and assist other fishers, friends and family. It was found that there is strong cohesion among fishers which promotes the sharing of bait, gas and fishing grounds; the lending of gear and equipment; giving advice, encouragement, and assistance with maintenance, repairs, cleaning fish, and hauling boats. Fishers also assist their family and friends by providing free fish, helping around the house, and giving financial support when they can.

Although 38.5% of the fishers (n=26) encountered in Phase II stated that there are no problems between them, conflicts, whether large or small in variety, are likely in many, if not all communities. 42.3% (n=26) claimed that disagreements are the result of fishers stealing or damaging each others' gear. An interesting finding was that only three fishers stated that conflicts arose over fishing grounds. There were even fewer reported conflicts between fishers and other marine resource users such as water taxi operators (WTOs) and recreational divers. Only 26.9% of fishers (n=26) pointed out concerns such as divers and tourists interfering with pots, the fact that foreign vessels are fishing illegally in their waters, and issues surrounding maritime boundaries.

Despite the very strong cohesion and co-operation observed among fishers of the Grenadines, they are not formally organized with the exception of Petite Martinique whose cooperative is suffering from debt and a lack of membership. All except one fisher stated that if a cooperative or association did exist they would become a member and take part. The majority, believe that a fishers' co-op is a great idea and hope to realise the following benefits: an increase in government investment and financial support into fishing; the provision of duty-free equipment; a reduc-

**Table 4.** Table showing the approximate costs per trip of fishers in the Grenadines

Type of fishing	Item	Price range	Average quantity per trip	Average cost per trip (US\$)
<b>Handline, tow, spear, trap, palang</b>	Oil	\$11-\$12/bottle	1.5 bottles / 24 oz	\$6.29
	Gas	\$9.50-\$12/gallon	1.5 tanks / 9 gallons	\$34.38
	Ice	n/a	1 bag / 5 blocks / 20lbs	\$4.04
	Bait	n/a	1 bucket / crate	\$25.50
	Food	n/a	Varies	\$4.66
			<b>Total</b>	<b>\$74.88</b>
<b>Longline</b>	Oil	\$150/bucket	2 buckets / 20 gallons	\$111.94
	Diesel	\$7/gallon	120 gallons	\$373.13
	Ice	\$0.15/lb	3000lbs	\$167.91
	Bait	\$2.50/lb	700lbs	\$652.99
	Food	n/a	Varies	\$149.25
			<b>Total</b>	<b>\$1,455.22</b>

tion in expenses such as gas prices in particular; the institution of a standard price for different varieties of fish; an increase in co-operation and information sharing between fishers themselves; and the support and organization of social events such as birthdays and friendly tournaments between fishers of the different islands. It is greatly hoped that formal organization would create one strong voice for the fishers and represent their best interests in the world of politics and resource management.

#### Natural Capital

Quite simply, “[n]atural capital is the term used for the natural resource stocks [in this case fish], from which resource flows and services [such as food provision], useful for livelihoods are derived” (DFID 1999). The influence of the vulnerability context on natural capital is great, as natural processes, which may even be human induced, can destroy the stocks which comprise the natural capital.

Table 1 demonstrates the fishers’ perception of the average abundance of fish groups five years ago and today, relative to ten years ago. It is clear that there is a general downward trend in fish numbers according the fishers of the Grenadines.

Fishers are an important source of information regarding the problems that surround fishing resources. In addition, they are in a position to suggest appropriate solutions to the issue of declining stock abundance. One such recommendation was to diversify or spread out fishing effort so

that certain areas do not become over-fished. Also, establishing temporary or permanent “no-take” zones was identified as a possible solution for critical areas that may be important for spawning or where habitats have been destroyed. Fishers and divers must be educated on the importance of having these protected areas which they may return to after stocks have recovered.

#### Physical Capital

“Physical capital comprises the basic infrastructure and producer goods needed to support livelihoods (DFID 1999).” Fishing equipment and facilities in particular, are very important to the success of fishers’ operations and without this physical capital productivity may be reduced.

Fishers are not only sensitive to the issues and the reduction in fish abundance, but they also have first-hand knowledge of the equipment, materials and facilities that are required to be efficient fishers. According to this in-depth survey, the majority of fishers appreciate the usefulness of technology such as GPS and fish finders (42.3%, n=26), and emergency or safety equipment (34.6%, n=26). Few (11.5%, n=26) mentioned needing specific fishing or dive gear. An interesting response from 30.8% of the fishers (n=26) interviewed was that they saw no need for any additional equipment. They reasoned that GPS in particular was not suitable for the types of boats that they have and for the distances that they travel. This information is useful for any initiative that may aim to provide fishing gear and

equipment for the fishers of the Grenadines. Further research can be conducted to determine exactly what is needed and what can actually be used appropriately, to ensure the efficient use of the gear and a successful outcome of such an initiative.

There are currently four fishing complexes located in the Grenadines which are equipped with refrigeration and locker facilities. Those found on the islands of Mustique and Canouan also provide accommodation and are functioning well, while the complexes in Bequia and Union Island were not in operation at the time of this study. The additional facilities required by fishers in each island are described in Table 2. Most respondents mentioned the need for closer gas stations, boat ramps, refrigeration facilities, proper selling stations and locker facilities for equipment and gear.

### Financial Capital

The last livelihood asset to be covered, financial capital “denotes the financial resources that people use to achieve their livelihood objectives” (DFID 1999). Sources of funds include regular flows from income primarily, and also stocks which are available through saving. Money is a very flexible and influential resource because it can be converted into other forms of capital.

One of the trials associated with fishing for a livelihood is that supply of and demand for fish are unstable.

Fishers do not have a set salary therefore they earn based on their catch and expenses. Sometimes a profit is earned and other times the catch earnings do not cover the operational costs and result in a loss. One of the most difficult questions in this livelihoods analysis was related to the monetary value of a fisher’s weekly catch. Some could only state what they would make on a “good day” and maintained that on a “bad day” they would simply make nothing. Nevertheless, a range of US \$34-\$1,866 was determined, and an average of US \$352 was calculated as the weekly catch earnings for the respondents of this survey. For a fisher that fishes six days a week, his annual catch is approximately US \$18,316.

The division of catch income from fishing in the Grenadines always depends on the owner of the boat and follows a share system. After the costs for oil and gas, etc. are taken out, the remainder is divided into a combination of 1, 2, and 4, or 3 and 4 as indicated in Table 3. Seiners and pot fishers usually take out half of the earnings for the equipment, then divide the remaining half between the boat, engine and crew.

Although expenditures are “easier” than earnings to quantify they still vary based on the type of fishing practiced, the time spent fishing, the distance travelled to fish, and the type of boat and engine used. Table 4 breaks down the average quantities and costs of oil, gas, ice, bait and food that are used per fishing trip and by the various types

**Table 5.** Summary table showing the status of livelihoods assets of fishers in the Grenadines

Livelihood Assets	Categories	Status
<b>Human Capital</b>	Traditional knowledge and skills	+
	Post-secondary education	-
	Training in advanced fishing techniques	+/-
<b>Social Capital</b>	Co-operation between fishers and other community members	+
	Conflicts between fishers and other marine resource users	+/-
<b>Natural Capital</b>	Deep-slope demersals and offshore pelagics fisheries	+
	Shallow-shelf demersals, lobster and conch fisheries	-
<b>Physical Capital</b>	Standard of living	+
	Ownership and financing of own gear and equipment	+
	Additional gear, equipment and facility requirements (safety, GPS, longline vessels, storage and locker facilities)	-
<b>Financial Capital</b>	Saving money	+
	Contribution towards household income	+
	Operational costs (per trip and maintenance)	-
	Capital for investing in physical capital	-

of fishing.

Quantities of ice, bait and food vary because: (1) not all fishers require ice for their short trips; (2) a lot of them catch their own bait or share bait (3) some bring food such as sandwiches from home, or do not take food on trips. Those that did use ice however, were from the Southern Grenadines, which suggests that either regulations or distance travelled to fish demands such preparations of the fish. Results show that the approximate average cost per trip for a small-scale fisher is US \$75 and US \$1,456 for longline fishers. The approximate yearly costs for a fisher that fishes 6 days a week is therefore US \$23,358.

Yearly maintenance costs were also difficult for the fishers of this livelihoods analysis to quantify. This is because, with the exception of painting, maintenance on the engine and boat occur on an "as need" basis, and fishers do not keep records of what was used to get the job done. On top of this, most maintenance is done by the fisher therefore he would not often have to pay for labour. The yearly maintenance costs for a boat owner was estimated at approximately US \$727.

Aside from the regular inflows and outflows of financial capital, funds are also stationary through savings. All fishers interviewed in this livelihoods analysis save some of their income, mostly in bank accounts, although a couple did keep it at home. Reasons for saving were mainly for emergency, children, boat maintenance, and for reserve in case fishing does not make much.

### Livelihood Strategies

A livelihood strategy is "the overarching term used to denote the range and combinations of activities and choices that people make in order to achieve their livelihood goals." It is a combination of various activities that are used to meet various needs and shows a positive correlation and reinforcing relationship with livelihood assets (DFID 1999).

Although most of the persons interviewed (79%, n=267) stated that fishing was their primary occupation, there were over 20 other main occupations identified by the remaining part-time fishers that are used to supplement their income. These were grouped into the categories seen in Figure 3.

The pie chart in Figure 4 shows the primary occupations of part-time fishers and clearly identifies skilled labour, construction in particular, as the most common income earning activity. Few fishers (4%, n=54) are employed in the public sector and relatively small proportions are involved in tourism (13%, n=54) and maritime and trade (15%, n=54) related occupations.

In establishing the reasons why the full-time fishers in this study chose fishing as a livelihood strategy, it was important to determine what occupations current fishers of the Grenadines were previously engaged in. These are grouped into the same categories that were used in the diagram above. Skilled labour was again the most common income

earning activity before respondents began to fish for a living (Figure 5). A large percentage of fishers or was also previously employed in the maritime and maritime trade industries (35%, n=26) whereas 23% (n=26) turned straight to fishing. Therefore, more than half the respondents were and continue to depend on marine resources and a significant proportion relied on fishing as their first means of earning an income. Four fishers indicated that tourism, bus driving, working in a store, and gardening respectively, were their occupations before they resorted to fishing.

To understand fishing in the Grenadines, it is important to understand why fishers chose fishing as a livelihood. Regardless of age and previous occupations, the majority of Phase II participants give a very simple answer to this question: "I enjoy it." The second most common response is that there are no other options or means of earning an income on the tiny islands of the Grenadines.

### CONCLUSION

Fishers in the Grenadines are subject to external factors such as market conditions, oil/gas prices and weather which are beyond their control. Unfortunately little is being done to reduce the risks their livelihoods face, for example, providing insurance schemes for fishers or seeking alternative markets for underexploited fish species. The livelihood assets which fishers of the Grenadines have achieved are summarized in Table 5 and seem to be in balance with each other with certain strengths (+) and weaknesses (-) working for and against their livelihoods. In terms of livelihood strategies, some degree of multi-occupationality is observed amongst fishers. This, however, does not deny the importance of the fishing industry to the people of the Grenadines.

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