Gulf and Caribbean Research Vol 19(2), 113–122, 2007 Manuscript received November 17, 2006; accepted February 22, 2007

UNDERSTANDING THE LOCAL LIVELIHOOD SYSTEM IN RESOURCE MANAGEMENT: THE PELAGIC LONGLINE FISHERY IN GOUYAVE, GRENADA

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A*BSTRACT* There is a need to include social objectives in fisheries management, and this paper focuses on one set of social considerations, those regarding livelihood. We pay particular attention to sustainable livelihood strategies, the importance of commercial pelagic longline fishing for the entire community livelihood system, and implications for management. Field data were obtained between December 2002 and March 2004 in Gouyave, Grenada, using participant observation, semi-structured interviews, and a quantitative survey. The economic base (fishing and agriculture) of the community is both unpredictable and seasonal, therefore individuals and households engage in diverse strategies to secure their livelihood. Three livelihood strategies were deemed important: 1) livelihood diversification, developing additional sources of income from agriculture, wage labor, and trade work, 2) fishing diversification, learning to switch to alternative gear and species, and 3) the availability of an informal "social security net" involving cash and in-kind assistance. These strategies help to spread the flow of income and food during lean times and across seasons. A major management implication is that fishery managers need to pay attention to the multi-species nature of fisheries and to the importance of livelihood diversification, including reliance on other economic sectors.

RESUMEN Existe la necesidad de incluir objetivos sociales en el manejo de la industria pesquera y este artículo se focaliza en un grupo de consideraciones sociales, las que se refieren al sustento. Prestanos particular atención a las estrategias de los sustento sostenibles, la importancia de la pesca pelágica comercial para el sustento de toda la comunida y las implicaciones para su manejo. Los datos de campo fueron obtenidos entre Diciembre del 2002 y Marzo del 2004 de Gouyave, Grenada a través del estudio de los participantes, entrevistas semi-estructuradas y un examen cuantitativo. La base económica (pesca y agricultura) de la comunidad es tanto impredecible como variable, por lo tanto individuos y hogares adoptan estrategias diversificadas para logar la seguridad del sustento. Tres estrategias de sustento fueron consideradas importantes: 1) diversificación de las actividades para sustento desarrollando fuentes de ingresos adicionales en agricultura, labor pagada y trabajo de obrero, 2) la diversificación de la pesca aprendiendo a utilizar hacia equipos y especies alternativas, y 3) la disponibilidad de una red de seguridad social que incluye asistencia monetaria y en especie. Estas estrategias diversificadas ayudan a distribuir el flujo de ingresos y alimentos a través de las estaciones. Un mayor involvcramiento en el manejo implica que los gerentes pesqueros presten mayor cuidado a la naturaleza multi-especies de la pesca y a la importancia de la diversificacion del sustento, incluyendo la confianza en otros sectores económicos.

INTRODUCTION

Caribbean fishery managers, as elsewhere, generally use biological and economic objectives to manage fisheries. The need to include social objectives has been discussed, but more needs to be done to integrate this consideration into fisheries planning and management (Berkes et al. 2001). Social objectives allow for the inclusion of human dimensions (resource user, community, and the socioeconomic environment) in the fisheries management system. One way to include social objectives is to analyze how individuals and households make a living from fishing but also how they structure their livelihood system, including non-fishing activities.

A livelihood "comprises the assets (natural, physical, human, financial and social capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household" (Ellis 2000, p.10). A large literature deals with frameworks of assets and vulnerabilities (Bebbington 1999). A sustainable livelihood is one with the ability to cope with and recover from stresses and shocks, maintain or enhance its capabilities, assets, and entitlements, while not undermining the natural resource base (Chambers and Conway 1992). A Caribbean household consists of people who may or may not be related by kinship, but who share living space including a kitchen and certain budgetary items such as food and rent. Hence, a household can be a single person living alone or a group of friends living together (Barrow 1998).

The concept of sustainable livelihood is useful for understanding the complexity and diversity of making a

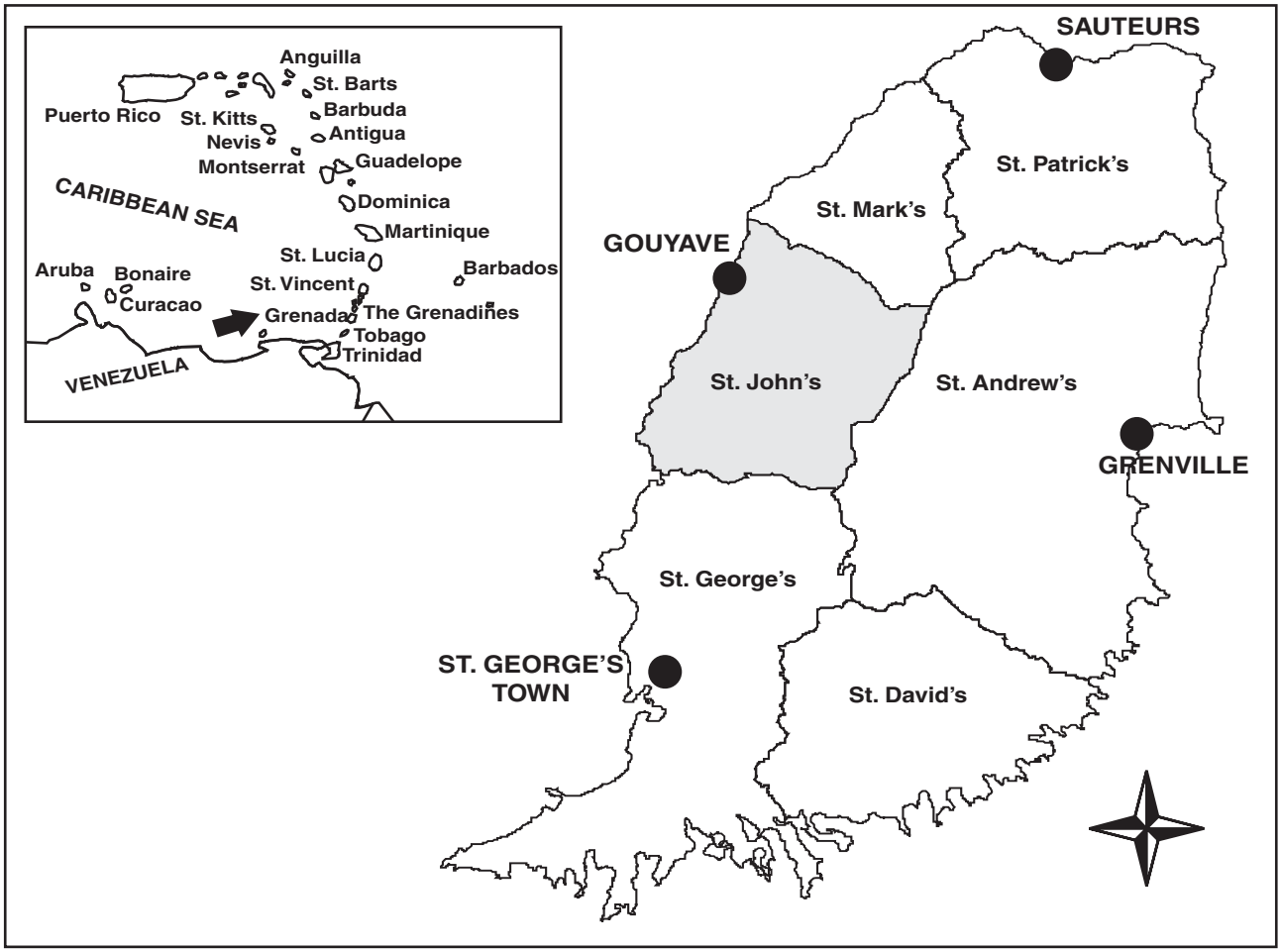

Figure 1. The study area: Grenada and the eastern Caribbean.

living, especially in developing countries (Chambers and Conway 1992, Ellis 2000, Allison and Ellis 2001). Of particular importance is the question of strategies used by households to secure their livelihood. In many poor and rural communities throughout the world, household survival depends upon the ability to develop a diverse array of livelihood activities and strategies (Chambers 1997, Ellis 2000, Ellis and Allison 2004).

Comitas (1962) observed in rural Jamaican communities that no single livelihood activity was lucrative enough for full-time specialization; therefore, households engaged in numerous social and economic activities to secure a living. Livelihood diversification is generally good for poor and rural households because it is an effective strategy for individuals to accumulate assets with which they can construct their own exit routes out of poverty (Ellis and Allison 2004), and it reduces the vulnerability of the poor (Marschke and Berkes 2006).

In fishing communities around the world, a number of livelihood diversification strategies have been documented. They include:

- Occupational pluralism, to widen the income-earning portfolio (Comitas 1962, Panayotou 1986, Rubenstein 1987, Allison and Ellis 2001);
- Flexibility in fishing activities, using different types of gear (Allison and Ellis 2001);
- Geographic mobility, fishing in different areas (Allison and Ellis 2001);
- Specialist-generalist alteration, operating in one fishery or multiple fisheries (Smith and McKelvey 1986);
- Dependency, making claims on relatives, friends, and government (Chambers and Conway 1992); and
- Modification of consumption patterns (Davis 1996, Ellis 1998).

An underlying reason for livelihood diversification is the seasonality of the resource base: "… fishing is a high-risk occupation, and one prone to seasonal and cyclical fluctuation in stock size and location… Diversification reduces the risk of livelihood failure by spreading it across more than one income source. It also helps to overcome the uneven use of assets (principally labor) caused by seasonality" (Allison and Ellis 2001, p. 383). Diversification

reduces vulnerability in the face of widespread market failures and uncertainties, and includes the ability to switch activities as necessary (Chambers 1997).

Through the application of the concept of sustainable livelihood this paper aims to further the understanding of diversification as a strategy by which fishing communities survive. We were interested in the usefulness of livelihood diversification for understanding the social and economic structure of the fishing community, and to use this understanding to inform fisheries management. The analysis highlights how the community of Gouyave whose economic base is pelagic fishing was able to use a diverse array of livelihood strategies to reduce its vulnerability to economic collapse.

The paper begins with an overview of the study area and research methods, and then describes how people make a living in the fishing community of Gouyave. This includes an examination of livelihood activities, diversification strategies, and seasonal patterns of main income sources (fishing, micro-business, and agriculture). The final section explores how livelihood considerations can be included in fisheries management.

STUDY AREA AND METHODS

Study area

Grenada is an island nation in the Eastern Caribbean, situated between latitudes 11°00′N and 12°30′N with a total area of 311 km^2 (Figure 1). The town of Gouyave, in the parish of St. John's is located on the west coast of the island about 19 km to the north of St. George's town by road. In 2001, Gouyave had an estimated population of 2,152 or about 2% of the nation's population. Of the estimated 2,200 fishers in Grenada, over 300 operate from Gouyave. The town has over 441 residential buildings and 112 commercial, housing 24 different commercial activities. The town has electricity and piped water, a developed network of roads, and access to an international airport to facilitate exports to Caribbean and international markets.

Gouyave has a multi-species and multi-gear fishing industry. The fishery is classified as small-scale, exploiting stocks of small and large pelagics (tuna, mackerel, billfish, flyingfish, dolphinfish, barracuda), coastal pelagic stocks (jack, bigeye scad, rainbow runner), and deep slope and reef demersal stocks (grouper, red hind, snapper). In terms of quantity and fishing effort, the main fish species are yellowfin tuna (*Thunnus albacares*), white marlin (*Tetrapturus albidus*), blue marlin (*Makaira nigricans*), common dolphinfish (*Coryphaena hippurus*), sailfish (*Istiophorus albicans*), swordfish (*Xiphias gladius*), blackfin tuna (*Thunnus atlanticus*), wahoo (*Acanthocybium solandri*), bigeye tuna (*Thunnus obesus*), and skipjack (*Katsuwonus pelamis*).

The main gear types are surface longline (over 82% of fishers), bottom longline, handline, beach seine, trolling, bankfishing (bottom handline), seche (a jigging handline technique), gillnet, and fish pot. The 3 categories of fishing vessels are the pirogue, launcher, and double-ender. There are 2 types the pirogue–open and cabin. Open pirogues are semi-decked, wooden, between 5–7 m long, powered by a single 15–40 hp outboard engine, and equipped for multiple-purpose fishing. Cabin pirogues, made from wood and/or fibreglass are 7–9 m long, powered by two 40–75 hp outboard engines, and equipped for longline fishing. The second category includes launchers made from wood and fiberglass. These are 9–15 m in length, powered by a 130–300 hp inboard diesel or gas engine, and equipped for overnight longline fishing. The third vessel category is the wooden double-ender powered by oars and equipped for beach seine fishing. A boat census conducted in Gouyave (2003) revealed there were 97 open pirogues (25 inactive), 26 cabin pirogues (6 inactive), 8 launchers, and 6 double-ender boats.

Methods

Data were collected between December 2002 to March 2004 by using secondary data sources, participant observation, semi-structured interviews, and a quantitative survey (Grant 2006). Published documents and reports provided background information on the demographics of the community and number of households. Participant observation involved working alongside selected individuals while they went about their daily activities. Detailed semi-structured interviews were conducted with 20 community members to obtain information as to how they provide food and income for their households, livelihood strategies, social support, and the roles of males and females in the household and community. This information was the basis for a more focused quantitative livelihood survey administered to 169 individuals. This survey focused on the strategies used by individuals involved primarily in fishing as compared to non-fishing livelihoods. Research findings from the quantitative survey were supplemented with semi-structured interviews and other methods to check for consistency in response. Quantitative analysis was performed using SPSS software.

HOW PEOPLE MAKE A LIVING

The following paraphrased quote is a fisher's response to the question: "How are you able to support your family?"

"I am a crew member on a large longline vessel, going to sea 2–4 d at a time. When I am not fishing I work on

TABLE 1

Primary, secondary, tertiary, and other sources of income by gender (*N* = 169).

Occupation Category	Principal income source			Secondary income source			Tertiary income source			Other source		
and group	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Fishing livelihood												
Fishing	66	1	67	22	1	23	8	–	8	4	–	4
Fish vendor	7	6	13	7	5	12	1	1	2	–	1	1
Support services	10	–	9	7	–	7	2	–	2	1	–	1
Fish processing worker	3	–	3	1	–	1	–	–	0	–	–	0
Sub-Total	86	7	93	37	6	43	11	1	12	5	1	6
Non-fishing livelihood												
Micro-business	7	7	14	5	17	22	6	1	7	2	–	2
Agriculture												
Nutmeg processing	–	9	9	–	–	0	–	–	0	–	–	0
Gardening	1	1	2	14	–	4	3	–	3	3	–	3
Government worker	7	3	10	3	7	10	4	1	5	1	–	1
Retired	5	4	9	–	–	0	–	–	0	–	–	0
Homemaker	–	8	8	–	1	1	–	–	0	–	–	0
Construction	6	–	6	6	–	6	7	–	7	1	–	1
Service industry	–	4	4	4	1	5	3	–	3	1	–	1
Student	4	–	4	–	–	0	–	–	0	–	–	0
Domestic worker	–	3	3	–	2	2	–	–	0	–	–	0
Professional	1	1	2	–	–	0	1	–	1	–	–	0
Tourism	1	1	2	–	–	0	–	–	0	–	–	0
Sub-Total	32	41	73	32	28	60	24	2	26	8	0	8
No livelihood	–	3	3	–	–	0	–	–	0	–	–	0
Total	118	51	169	69	34	103	35	3	38	13	1	14

my farm, or repair nets, and make sacs and 'bazor' [fishing gear] for other fishermen. During fishing off-season, July to September, I use my small wooden boat to go snapper fishing using bottom longline or bankfishing; and during the fishing season I rent this same boat to the beach seine fishery. The income from snapper fishing is very small compared to longlining, but I am able to eat and make some extra money for my family. I have to support my wife and 6 children.

"I rent 3 acres [1.2 ha] of agricultural land, just one mile [1.6 km] from my house. I plant nutmeg (*Myristica fragans*), cocoa, banana, corn, yam, and pigeon peas. Nutmeg is my highest income crop, so I spend a lot of time picking, removing mace, drying, and transporting it to the Nutmeg Pool [Grenada Cooperative Nutmeg Association]. My wife and children help me a lot, especially with drying nutmegs and 'shelling' pigeon peas.

"I would say I spend about 90% of my time fishing and 5% on agriculture, but I earn 80% of my income from fishing and 15% from agriculture. These days, it is very difficult to make ends meet. You have to do a number of different things to support your family, and you also have to give a little to your neighbor because you can never tell what will happen to you tomorrow; you may need the help."

Thus, to take care of his family, this individual was involved in a diverse number of livelihood activities, which was common among fishers and community members.

Diversification strategies in Gouyave

Livelihood diversification. Economic livelihood activities available to community members are summarized in Table 1, while Table 2 lists their specific occupations within the fishing and non-fishing groups. Male and female respondents were involved in 1–7 livelihood activities with most individuals involved in two. Household livelihood strategies ranged from situations where only the head of household engaged in economic activities to those where all household members worked sometimes at more than one activity.

For males, fishing was the principal income source; other important activities were micro-business, agriculture, government, and construction. Females did little or no fishing (only one female fished regularly with her male partner); however, they were involved as vendors and investors. Regarding non-fishing livelihood activities, women were employed in agriculture mainly as nutmeg processors at the GCNA receiving station in Gouyave. The second livelihood activity for women was homemaking or staying home to care for children and elderly relatives, and the third was micro-business.

When consideration is made of the respondents' various sources of income, the importance of fishing is evident (Table 1). Fishing was the sole source of income for 21% of respondents, while the remainder combined fishing and non-fishing activities. Figure 2 shows that by separating principal income sources on the basis of fishing and non-fishing activities, fishing activities are integrated into the scheme of secondary and tertiary income sources. Thus, a man whose main livelihood was construction could participate in beach seine hauling early in the morning prior to work or at weekends.

Fishing diversification. Fishers were involved in multiple fishing activities by combining specialization (a single activity) and multi-tasking (several fishing activities).

Role specialization and multi-tasking. Of the 67 individuals involved in fishing as a principal occupation, 43% combined different roles (Table 3). For example, a boat owner could spend much of his time as captain of his own boat yet might also crew or captain another boat.

Gear specialization and multi-tasking. Of fishers involved in fishing as a principal occupation, 27% were specialists using only longline gear while 66% combined specialization and multi-tasking by specializing in the longline gear but also switched to beach seine, bottom longline, handline, bank fishing, seche, gillnet, fish trap, and vertical longline. About 10% of fishers were no longer involved in longline fishing because of their age; they lacked the physical strength to handle the gear.

Combining fishing occupations. Of the fishers involved in fishing as a principal occupation, 33% mixed fishing occupations (Table 4). Although most fishers were specialists in longline, they performed other fishing occu-

TABLE 2

Occupation grouped under general headings and actual occupation by fishing and non-fishing livelihood activities in Gouyave. [1]'Lambia' or boat helper is an individual who works for a boat owner or captain removing fish from the boat, cleaning the boat, purchasing gas, and making sure the boat was ready for the next fishing trip. [2]cleans roadside drains.

Occupation category and group	Occupation
Fishing livelihood	
Fishing	Sailor/crew, captain, boat owner and captain, boat owner
Fish vendor	Retail vendor, retail distributor, wholesale distributor, 'conductor/driver', opportunistic vendor
Support service	Boat builder, boat repair, 'lambia'[1] or boat helper, engine repair, clean fish
Fish processing worker	Manager, clerk, worker, driver
Non-fishing livelihood	
Agriculture	Farmer, laborer, nutmeg processor
Construction	Masonry, carpenter, bricklayer, contractor, electrician, house painter, plumber, tile layer, welder, road construction
Domestic worker	Cook, washerwoman, servant, babysitter
Government worker	Civil servant, police, fire, postal employee, road worker[2], port worker
Homemaker	Stay home and take care of children, home care for elderly
Micro-business	Entrepreneur, hairdresser, barber, land owner, restaurant/shop owner, dressmaker, shoemaker, street vendors (petty, mobile restaurant and bar)
Professional	Teacher, manager, nurse, accountant, pilot, clerk
Service industry	Bartender, waiter, janitor, sales person, shop keeper, security guard, entertainer
Student	Primary, secondary, vocational
Tourism	Craft maker, craft vendor, hotel worker, bus tour operator

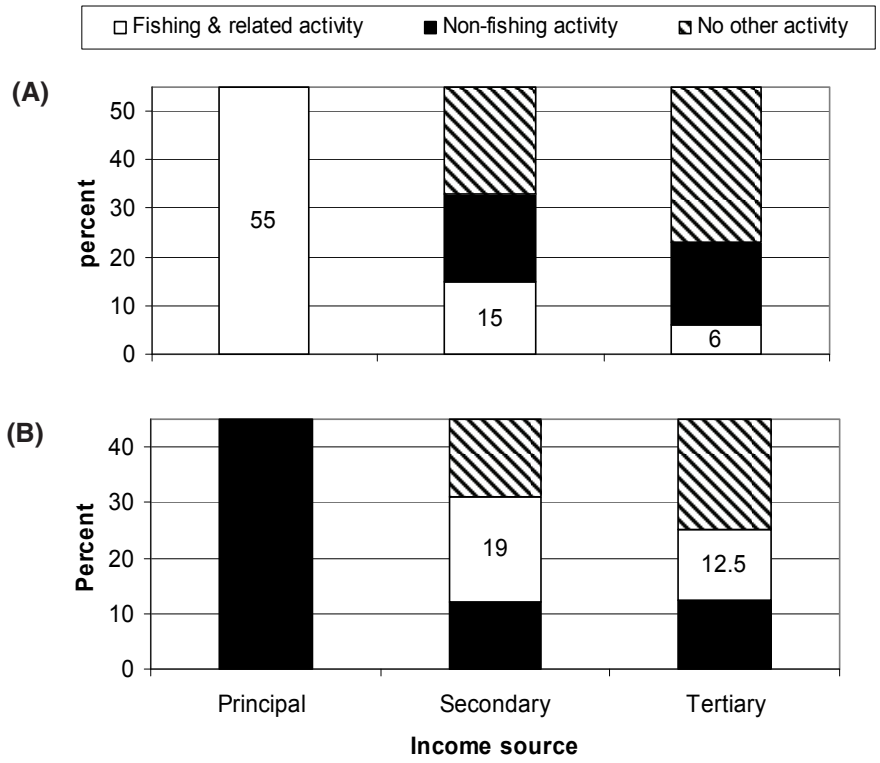

Figure 2. The distribution of respondents involved in fishing livelihood (A) and respondents involved in non-fishing livelihoods (B) their secondary and tertiary income source.

pations, such as selling fish and working part-time as a boat helper. They switched from one fishing occupation to another, with the exception of engine repair and boat building which required special training.

Community's social security net. When household heads were asked if they were able to adequately support their household, 43% said 'yes', 40% said 'barely' (only able to meet immediate financial obligations), 16% said 'no', and 1% gave no response. Although fishers on the whole made a basic living from fishing and related activities by local standards, over half of the respondents were barely able to achieve economic security. It was noted that in the absence of a cash income, households relied on regular assistance in cash and in-kind from family and friends, both locally and overseas (66%), while 25% received no such assistance. Of households reporting they could adequately support themselves, 30% indicated they also received some assistance from families and friends. Such assistance included gifts of fish (43%), gifts of cash (24%), cooking and sharing meals (17%), grooming hair (5%), cleaning fish, domestic assistance, providing loans (4% each), and giving away food crops (3%). Only 2% reported they were unable to give because they needed assistance.

Gifts of fish were common as 93% of fishers reported disposing of a mean of 16 kg of pelagic fish to members of the community after each trip. Often the head and tail sections, and organs of yellowfin tuna destined for export were given away, although left over bait and pieces of sailfish and dolphinfish were also dispensed. These gifts helped sustain households as the fish was either used for home consumption or sold. Those who gave did so in anticipation that if at some future time they were to fall on hard times their generosity would be remembered and

TABLE 3

Role of fishers whose principal income source is fishing ($N = 67$). *Up to 11% of boat owners/investors are involved in fishing as secondary and other income sources.

Role in fishing	Percent
Crew	33
Captain	24
Boat Owner/Captain	21
Boat Owner/Investor*	1
Boat Owner/Investor and Boat Owner/Captain	5
Boat Owner/Captain and Crew	6
Boat Owner/Captain and Captain other owners' boat	6
Captain and Crew	3
Boat Owner and Captain other owners' boat	1
Total	100

TABLE 4

Number of respondents whose principal income source is fishing livelihood and other income source involves fishing and related activities.

	Other fishing livelihood					
Principal fishing livelihood	**Fishing**	**Fish vendor**	**Boat helper**	**Rent boat**	**Sell fishing equipment**	**Total**
Fishing	–	3	1	7	–	11
Fish vendor	2	–	–	–	–	2
Support services						
Boat helper	2	1	–	–	–	3
Engine repair and maintenance	2	–	–	–	–	2
Fish cleaner	–	1	1	–	–	2
Fish processing worker	–	–	–	1	1	2
Total	6	5	2	8	1	22

reciprocated. These traditional customs have reinforced strong social relationships in the community.

Seasonal livelihood patterns

The economic activities of fishing, agriculture, and related spin-off businesses are seasonal and result in household incomes fluctuating over the year. The following discussion reveals the variation for each of these activities.

Fishing. Income from fishing is related to the peak harvesting periods of the principal species (Table 5). The highest income-generating species were yellowfin tuna, sailfish, and marlin; medium-income earners were blackfin tuna and dolphinfish; whereas flyingfish, jacks, and snappers were the least valuable. On this basis, the most lucrative period for fishers was from March to August. In terms of the social significance that comes from the giving of fish, then flyingfish and jacks were most important. Since their availability extends from February through until the end of October (Table 5), the generosity of fishers helps sustain the community for the greater part of the year.

TABLE 5

Peak harvesting periods for main fish species and gear caught by fishers in Gouyave (shaded). Source: Key interviewees.

		Longline gear				Other gears			
Season	Month	yellowfin tuna	sailfish	marlin	dolphinfish	snapper	blackfin tuna	flyingfish	jack
Dry	Jan		■						
	Feb		■	■	■			■	
	Mar	■	■	■	■			■	
	Apr	■		■	■		■	■	■
	May	■		■	■		■	■	■
	Jun	■		■	■	■	■	■	■
Wet	Jul	■				■	■		■
	Aug	■				■	■		■
	Sep					■	■		■
	Oct		■			■	■		■
	Nov		■			■			
	Dec		■						

Agriculture. Seasonality of farming activities stems from the uneven distribution of annual rainfall. With the first 5 months of the year being dry, the time for land preparation and subsequent planting occurred between May and August, except for some vegetable crops that were irrigated. Throughout the remainder of the year various crops were harvested (Table 6). Those cultivating plants regarded themselves as gardeners as distinct from farmers who were considered to have a greater commitment to land than they did. For most, gardening was a subsistence-type strategy that was done during one's discretionary time on land that was rented or owned.

From discussion with 6 fishers who worked the land, 2 types of gardening were identified: the kitchen garden variety that could be found on any available land associated with the house spot; and a larger garden that existed on plots of land some distance from the house, in one case 11 km away. On the former, crops such as cabbage, corn, dasheen, pigeon peas, and tomatoes might be grown. Usually no more than a few hours per day were spent on weeding and watering these crops that were destined for household consumption. Large gardens, ranged from 0.1–2 ha, had a variety of fruit trees, bananas, traditional export crops (cocoa and nutmeg), roots and tubers, as well as corn and pigeon peas. These gardens were visited 2–4 times a

TABLE 6

Planting (grey) and harvesting (black) of main crops planted by gardeners in Gouyave.

Seasons	Months	root and tubers[1]	corn	pigeon peas	sorrel	vegetables[2]	fruits[3]	citrus[4]	bananas[5]	nutmeg	cocoa
Dry	Jan										
	Feb										
	Mar										
	Apr										
	May										
	Jun										
Wet	Jul										
	Aug										
	Sep										
	Oct										
	Nov										
	Dec										

Source: Key interviewees key:
[1] roots and tubers – dasheen, tannias, yams, potatoes
[2] vegetables – cabbage, carrots, sweet pepper, lettuce, tomatoes
[3] fruits – golden apples, mangoes, guavas, soursop, plums, sapodillas, cherry
[4] citrus – oranges, grapefruits, tangerines
[5] bananas – bluggoes, bananas, plantains

week, with the entire family providing assistance at key harvesting times. Besides supplying their households with staples, these lands were a source of cash crops that were sold to national outlets such as nutmegs to the GCNA, cocoa to the Grenada Cocoa Association (GCA), and fruits and vegetables to the Grenada National Marketing and Importing Board and local vendors.

Spin-off businesses. Since these activities involved the processing of fish and agricultural commodities they have corresponding seasonal cycles (Table 7). For example, when flyingfish were in season women perform the value-added work of filleting, packing, and selling them. Similarly when jacks were abundant women continue the long-standing tradition of cleaning and sun-drying them prior to selling them in Grenville, a town off Grenada's east coast (Figure 1). Farm commodities, during their respective harvesting season, were prepared in a number of ways. For instance, fruits were washed, bagged, and sold either on the street or in markets. Corn cobs were roasted in roadside coal stoves for sale. Pigeon peas were shelled, sorted, and bagged for sale. Cocoa beans not sold to the GCA were made into cocoa balls by grinding the beans, adding spices, and rolling into balls for later use in making hot beverage. Sorrel (fleshy sepal of a tropical plant Roselle) was stripped, bagged, and sold to make a drink. A few enterprising individuals set up mobile bars ('igloo' containers on wheels) from which they sold alcohol and drinks and mobile restaurants (portable stove on a table) from which they sold fried chicken, fish, and fries. Activities such as these are practical cottage industries that augment household incomes.

MANAGING THE "HUMAN SYSTEM" IN FISHERIES

The importance of fishing to the community

The idea of sustainable livelihood in Gouyave involves maintaining a diverse portfolio of livelihood activities and strategies, as elsewhere in rural communities in the Caribbean. Such strategies include livelihood diversification that involves combining incomes from fishing, agriculture, construction, and micro-businesses; and fishing diversification where fishers switch to alternative gear, roles, and occupations to take advantage of species availability and fishing livelihood activities.

Fishing is the main economic contributor to the local economy, as it provides food, income, direct and indi-

TABLE 7

Monthly peak harvesting of fish and agricultural commodities and the resulting spin-off business activities. YFT = yellow fin tuna; BFT = black fin tuna.

Month	Fish commodities	Agricultural commodities	Spin-off micro-business activities
JAN	sailfish	reap yams, pigeon peas, cash crops, bananas, cocoa	pigeon peas
FEB	sailfish, flyingfish, marlin		
MAR	YFT, BFT, flyingfish		fillet flyingfish, 'cocoa balls'
APR	YFT, BFT, flyingfish		
MAY	YFT, BFT, flyingfish, marlin		
JUN	YFT, BFT, jack, marlin	planting season	mobile restaurants
JUL	YFT, BFT, jack		dried jack
AUG	YFT, BFT, jack		mobile restaurants, roast corn, fruits
SEP	BFT, jack, snapper	reap yams, corn, pigeon peas, sorrel, cash crops, fruits, citrus, nutmeg	Roast corn, fruits, dried jack
OCT	BFT, jack, snapper		roast corn, dried jack
NOV	sailfish		
DEC	sailfish		pigeon peas, sorrel

rect employment, and micro-business opportunities. It has evolved into the main contributor because of poor employment opportunities in Grenada. Fishing is also an accessible occupation as no fishing license or formal training is required, as training is done on the job with a competent captain. Likewise, to purchase fishing equipment, fishers can apply for a loan at the bank or through the Fisheries Division. Fishers also have access to international markets via government and private sector organizations to export fish.

Expenditures for and earnings from fishing are channeled back to the community, creating an economic multiplier effect. The economic multiplier is manifested by income from fishing consumed in the community on food, alcohol, clothing, and entertainment. When fish catches are high, income and consumption increase, this creates jobs for other community members in the service sector. It is possible to tell by walking down the street in Gouyave if fishers are catching fish. If the streets are relatively quiet with a number of shops closed, one can tell that no fish has been caught lately. However, if people are in the streets, the bars are open late, and there is merriment then the fishery is doing well.

Fishing helps to build social relations and cultural identity (Jentoft 2000). Social relations in the community, built on reciprocal obligations, revolve around fish. The sharing and exchanging of fish for cash (non-commercial transaction) and in-kind assistance help to maintain connections with family and friends in the community, in other communities, and abroad. Social relations and cultural rules regarding the sharing of fish provide a social safety net to help support households that are in need.

The diversity and complexity of livelihood spreads the flow of income and food across the seasons, making households more stable and less vulnerable to the uncertainty in food production and of daily life (Chambers et al. 1981, Sahn 1989). The seasonality of fish and agricultural commodities works for the benefit of households by allowing community members to switch between and among fishing and non-fishing livelihoods. Such fluidity is the key to a successful livelihood strategy.

Management implications

To include social objectives in fisheries planning and management, a key implication of the findings is that management options based solely on fisheries science, such as effort reduction, quotas, and other conservation measures, should not be instituted without first considering their social and economic implications. Fishing is the social and economic thread that binds fishers and community members together as fish are eaten, bartered, exchanged for cash and services, used to repay debt, and meet social obligations. Therefore, any major crisis or change in policy could cause widespread repercussions in the community and the island state.

Conventional management tends to take a single-species approach. What is needed instead is an ecosystem based management approach that takes into consideration the complex multi-species, multi-gear nature of the fishing industry where fishers are continuously altering their fishing practice, gear, and fishing area to exploit multiple resources in the seasonal round. The management of large pelagic species needs to consider coastal pelagic species that are used as bait in the pelagic fishery. Likewise,

conservation measures for one fish species could increase the exploitation of another. Ecosystem based management gives fishers the flexibility to switch between different species according to season and boosts spin-off micro-businesses which increases households stability.

Fishing as part of a broader livelihood context needs to be managed with attention to both fishing and non-fishing livelihoods. The problem is that non-fishing sectors are outside the mandate of Fisheries Division, and government agencies do not collaborate well with each other; promoting sustainable livelihoods for communities will require such horizontal collaboration. As well, regional/international fisheries regulations can impact livelihood. Hence, improved communication through the establishment of linkages, across the various levels of management from the community to regional and international levels (i.e., vertical linkages), is important for community livelihood (Grant 2006, Berkes 2006).

In conclusion, to manage fisheries with attention to social and economic as well as biological objectives, managers need to understand the livelihood systems of fishing communities (Pomeroy and Rivera-Guieb 2006, Allison and Ellis 2001). Such livelihood systems involve fishing diversification, including seasonal changes in species and gear, and taking a multi-species approach. They also involve livelihood diversification at the local level with attention to sectors such as micro-business, agriculture, tourism, and construction. Integrating social objectives into fisheries management would involve a number of conditions that do not exist in the present fishery: building horizontal linkages between the Fisheries Division and other agencies, and vertical linkages between fishing communities and the various levels of management (national and international), through increased collaboration, communication, and understanding.

ACKNOWLEDGEMENTS

We thank Gouyave fishers, Gouyave fish market staff, the Grenada Fisheries Division, and the CARICOM Fisheries Unit (Caribbean Regional Fisheries Mechanism (CRFM)). The project was supported by the International Development Research Centre (IDRC) and the Canada Research Chairs (http://www.chairs.gc.ca) program.

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