A description of the sea urchin fishery in Laborie, St. Lucia

A.H. Smith and S. Koester

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This report is a product of a research project aimed at testing and developing tools, methods and approaches critical to the sustainable development of coastal communities in the Caribbean and other parts of the world. The project, called *People and the Sea: a Study of Coastal Livelihoods in Laborie, St. Lucia*, is implemented by the Caribbean Natural Resources Institute (CANARI) in collaboration with the Laborie Development Planning Committee (LDPC), the Department of Fisheries in the Government of St. Lucia, and a number of governmental and community organisations. *People and the Sea* is funded by the United Kingdom Department for International Development (DFID) under its Natural Resources Systems Programme, and receives technical assistance from the Institute of Development Studies at the University of Sussex in the UK.

The primary focus of this initiative is on testing and developing specific tools and methods in participatory planning, institutional design and sustainable use. *People and the Sea* therefore tests, develops, refines and documents methods that aim at increasing effective participation of stakeholders in all stages of planning and management. It also explores and documents technologies and management tools which can enhance the social and economic benefits derived from the sustainable use of coastal resources, and particularly from the reef fishery, sea urchin harvesting, seaweed cultivation and heritage tourism. At the same time, the project will help to evaluate the impact of participation on the sustainability of resource use and on the livelihoods of people, by identifying and monitoring concrete linkages between institutional and technological change on the one hand, and the well-being of both the people and the reefs on the other. At the end of the project, results will be analysed, documented and disseminated for the benefit of resource managers and policy makers within and outside the Caribbean region.

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For more information on *People and the Sea*, contact:

Caribbean Natural Resources Institute (CANARI), New Dock Road, Box 383, Vieux Fort, St. Lucia, tel: 758.454.6060, fax: 758. 454.5188. E-mail: canari@candw.lc, or

Laborie Development Planning Committee, c/o Laborie Boys' Primary School, Citrus Grove, Laborie, St. Lucia. E-mail: lbp_sch@candw.lc.

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A description of the sea urchin fishery in Laborie, St. Lucia

Allan H. Smith[1] and Stephen Koester[2]

[1]Caribbean Natural Resources Institute (CANARI)
[2]Department of Anthropology, University of Colorado at Denver

Background

An assessment of the past and present uses of reef resources in Laborie Bay, being undertaken as part of the present project, has indicated that the white-spined sea urchin has supported a seasonal fishery of importance to the community for many years. The fishery has been suspended in recent years, either voluntarily by the community, or through closure by Government, due to severe declines in the urchin stocks, particularly in the early 1980s and mid 1990s. Similar declines were observed in many Eastern Caribbean islands in the same period. In 2000, a strong recruitment of juvenile sea urchins was observed around the southeast of St. Lucia, resulting in an increase in abundance to potentially harvestable levels and a renewed interest in possible access to the resource.

One of the case studies being carried out under the *People and the Sea* project is a study of the process of establishing a management system for the sea egg resource. The first activity was a survey of key informants to gather information on the sea egg fishery to supplement both the existing documentation and the results of monitoring of the status of the stocks.

The resource

The white-spined sea urchin, *Tripneustes ventricosus*, known locally as the sea egg or *chadon*, is common throughout the Caribbean and on the west coast of Africa. It is found mainly in shallow water to a depth of 10m, in sea grass beds and on rock or coral rubble flats where there is a good cover of seaweeds. Sexes are separate, but it is not possible to distinguish between males and females from their external appearance. There are locally important sea egg fisheries in many islands in the region, notably St. Lucia, Barbados and Martinique, where they are harvested for their edible roe. They are particularly vulnerable to overfishing because their habitat is mostly shallow, close to shore and easily accessible.

To breed, male and female sea eggs spawn and the eggs are fertilised as they float in the water. Although there is some spawning year round, most of the sea egg population in an area spawns at about the same time, usually between April and August, which increases the chance of successful fertilisation. The developing larvae drift with the ocean currents for about four weeks, after which they need to find a suitable place to settle or they will die. During that development stage the larvae may be carried far from their parent population before settling. Alternatively, local counter-currents may keep the larvae in the same area until they are ready to settle.
After settling on the bottom, usually in September and October, juvenile sea eggs begin growing rapidly,

reaching sexual maturity and a diameter of 65mm to 75mm (about 2.5 to 3 inches) in the first year. The life span is three years and the maximum size for both sexes is approximately 130mm (5 to 6 inches) in diameter.

The abundance of sea eggs in St. Lucia has varied over the past two decades, presumably as a result of natural events and harvest pressure. Sea eggs were said to have been abundant in Laborie Bay and the adjacent smaller bays for many years prior to the time of Hurricane David in 1979 and Hurricane Allen in late July the following year. Allen was a devastating storm that greatly reduced the numbers of sea eggs in the Laborie and Vieux Fort areas. Recovery was slow but numbers had increased noticeably by 1986.

A second decline in numbers occurred late 1994, coinciding with the passage of Tropical Storm Debbie in September of that year. The storm brought very heavy rains and its impact on the sea egg stocks was most likely due to siltation from erosion and run-off. For a year after the storm, mud would be re-suspended whenever the sea was rough.

Sea egg numbers increased very slowly in the following five years but the strong recruitment in 2000 resulted in a dramatic increase in abundance in 2001. Similar increases were reported from Barbados, St. Vincent and the Grenadines, and Martinique. The long-term significance of this event is, however, uncertain. The settlement of juveniles of many invertebrates can be extremely variable from year to year and this variability has been observed in other species of Tropical Atlantic sea urchin species. An enormous increase in juveniles one year may be followed by a number of years of little settlement. The causes and mechanisms of these fluctuations are still poorly understood.

The sea egg fishery in Laborie

The sea egg has a long history as a seasonal delicacy among St. Lucians and other West Indians. In addition to appreciating sea eggs for their taste, some informants in Laborie explained that sea eggs are considered to be “good” for both women and men, as opposed to octopus, for example, which is considered “good’ for men only.

Throughout the 1950s and 60s villagers from Laborie and nearby areas harvested sea eggs from August through December for local consumption. While the sale was largely confined to the local area, vendors would occasionally take sea eggs by bus or canoe to Castries, the island's primary port. As one local diver explained, there was not a great demand for sea eggs in the 1960s and many people were unfamiliar with sea eggs as a food source. In addition, St. Lucia's economy at that time was based on plantation agriculture and small-scale farming. Cash wages were small and households provided much of their own food needs.

During that time the beginning of the sea egg harvest was always associated with the August school holidays. Diving for sea eggs was an enjoyable activity for children, who would make rafts by putting sticks through the trunks of four or five banana plants, or by tying three or four logs of *gonmyé modi*

together. Diving for sea eggs and selling them was also part of an informal apprenticeship for boys who aspired to be fishermen. These “boat boys” would harvest sea eggs while the fishermen were at sea. After the school holidays, others would join in the harvest.

To determine if sea eggs were ready to harvest, divers would take a few and break them open. If they were not “ripe” – having a firm consistency - divers would move on to another area to test. Although harvesting at that time began in August, this is considered by some people to be too early in the year as the roe tends to "melt" when it is removed, although lime-juice can be used to make the roe firmer. By September the roe is firmer[1]. In the 1950s and 1960s, the season never extended past December even if there were still sea eggs available for harvesting. Local informants remember this period as a time when sea eggs were plentiful. One diver explained that back then people managed the resource themselves, but that in his view, there really wasn't any management, "The sea egg was just there, when ready everybody took it."

In the 1970s and 80s, the main harvest for local consumption continued to coincide with the school holidays and extend through December. August is also a time when people return from abroad to visit. However, the harvest was open access and some people would harvest for personal use at any time of the year, for example to add to rice cooked on the beach during picnics. Although sea eggs continued to be sold locally, they also became significant as an export commodity in the 1970s. A profitable business emerged based on the demand for sea eggs in Martinique. Local residents harvested, cooked and sold to buyers from distant leeward villages and directly to Martinican entrepreneurs who traveled between Martinique and St. Lucia. Several informants remembered one particular entrepreneur, a woman from Gros Islet, the island's most northern leeward village. Prior to this, the only local marine resource with a Martinican market was conch. Harvesting in Laborie Bay was primarily done by people from the village, but people from Vieux Fort would sometimes come by boat to harvest the outer reefs and return to Vieux Fort without coming near shore. During this time, a harvester from Vieux Fort was said to have designed a basket for diving, increasing the efficiency and speed with which the sea eggs could be collected.

Men, women and children all had roles to play in the production process. Women and teenagers often dived for the eggs, children would break the shells, and both men and women prepared them. For some, sea eggs were an important part of the household economy. One harvester described his household’s production process explaining that they would collect approximately 50 sea eggs at a time, roast half, send those for sale and then roast the remaining eggs while more were being collected. Divers would sometimes let the children who broke the shells sell the prepared eggs locally. As one former harvester stated, “We knew how many we gave them.” In addition to selling house to house, people would sell by the side of the west coast highway. During the 1970s and 1980s, a prepared shell sold for EC$1.00 to EC$1.50.

[1] Note that “melting” describes the roe of sea eggs that are spawning. After spawning the roe still contains nutritive cells and remains firm on handling although it will have decreased in volume. Thus the preference for firmer roe means that the harvest may be delayed until after the peak spawning season.

The most common method of cooking was to fill a carefully cleaned shell with the roe of a number of urchins and to roast it next to a fire. A stick from the middle of a coconut leaf, called a *touch koko,* would be inserted and if it came out dry the sea egg was cooked. If it was wet the shell would be turned and cooked further until it was ready. The roe is sometimes eaten raw as well, in which case lime-juice is used to reduce the strong taste, which is referred to as "the freshness." By 1980, the demand for prepared sea eggs in Martinique declined, replaced by a preference for uncooked roe, which fetched EC$15.00 to $20.00 per pound. However, the scarcity of sea eggs after Hurricane Allen put an end to this thriving trade.

Throughout the two decades described above, harvesters followed a traditional procedure for getting rid of sea egg waste. After breaking the shells and roasting the eggs, the shells and other remains of the urchins would be buried in the sand so that they would not foul the beach or injure people's bare feet. A 70 year old fisherman emphasized the history of this tradition by digging a hole and then scooping up a handful of beach sand. As he pointed out the tiny pieces of sea egg shell, he said, "Long before I was born, these eggs were buried here." He mentioned that in the past, people used to land the sea eggs at *Foulacho,* a beach on the north end of Laborie Bay. At that time there were no houses there. The beach's name *Foulacho* refers to the location of a limekiln, a reference to its use as a place where people burned coral to make quicklime. Only one informant, a 51 year old fisherman, attributed the burying of sea egg shells to anything other than hygiene. He stated that "The old people say when you leave the shells in the sea, it will push them out." He added that when people in Laborie used to harvest sea eggs, they all followed a rule of not throwing the broken shells into the water. It is still widely believed that sea eggs will leave an area where broken shells are dumped in the water. "Nobody wants to live in a cemetery" said one harvester.

Management and legislation

Prior to 1984 there was no specific legislation for the sea egg fishery. The 1984 Fisheries (Lobster, Turtle and Fish Protection) Regulations Section no. 10 included a "prohibition against the disturbance of sea urchins" without the written permission of the Chief Fisheries Officer. However, there was no management plan put in place at that time. The subsequent development of management strategies was largely based on the situation in Vieux Fort, and in consultation with harvesters from that area. Early in 1987, access to a market in Martinique, established by an entrepreneur from Castries, led to a great increase in harvesting effort around Vieux Fort, which was publicised in the press. In response to the observed rapid decline in the stocks, the fishery was formally closed by the Department of Fisheries in December of 1987. This ban remained in force until 1990.

Between 1987 and 1989 a monitoring programme was carried out in the Vieux Fort area and in Laborie to assess sea egg abundance, growth and recruitment. The main purpose was to establish the conditions for the recovery of the stocks and the management of the harvest. Sea egg harvesters were kept informed of the findings and in 1989 discussions began on the feasibility of implementing a co-management arrangement and resuming the harvest under controlled conditions. The agreement was

finalised in 1989 and in September of that year the fishery was re-opened under the Regulation 7 of the Fisheries (Turtle, Lobster and Fish Protection) Regulations, Statutory Instrument No. 67 of 1987, with the harvesters assuming some of the management responsibility. This included observing a minimum size limit of sea eggs of 3.5 inches diameter (which essentially protected the one year old size class) and reporting when the larger size classes were depleted so that the harvest could be closed. Harvesters were issued with identification cards. No export of sea eggs was permitted without an export license, although none were issued. Harvesting licenses were issued again in 1990 and 1991 but for Vieux Fort only as surveys had shown that numbers remained low in Laborie Bay. For the first time the licensing included a maximum permitted selling price which was set at EC$10.00 per filled shell. In 1992 there was an added requirement for sea egg vendors to obtain licenses.

In 1993, the Department of Fisheries issued notices that sea egg harvesters would be required to form groups, and to identify individuals who would represent them in licensing negotiations. It was also noted that this requirement applied not only to Vieux Fort, but also to Laborie, Anse Ger and Praslin and that these groups would be asked to participate in annual monitoring to assess the status of sea egg stocks before licenses would be issued. In the event, monitoring that year showed that stocks were lower than previous years and no licenses were issued in 1993 or 1994.

Surveys by the Department of Fisheries showed that stocks remained low in Laborie in 1995 and the fishery remained closed. Licenses were issued only for Vieux Fort (under the Fisheries Regulations no. 9 of 1994) with size limit increased to 4 inches diameter, and with a further requirement for the sea egg cleaners to obtain licenses. No licenses have been issued for Laborie since then.

Harvesting has continued illegally around Vieux Fort and Laborie, particularly during that past two years. In October of 2000, even though the ban imposed by DOF was still in effect, harvesters from Vieux Fort came to dive for sea eggs in Laborie Bay. Local men confronted these harvesters and told them to leave the sea eggs alone. The individual who related this story added that there was a feeling that these sea eggs in the Bay belong to the people of Laborie.

The disappearances and recovery

Informants often generalized the period before Hurricane Allen, simply remembering this as a time when sea eggs were plentiful and conflicts between harvesters were rare. One resident fisherman summarized this period stating that sea eggs were abundant from Laborie Bay's southern point all the way to Piaye to the west, that the people of Laborie could not harvest them all and that families could maintain their homes from August to December on what they made from harvesting sea eggs. This same individual said that after the harvest was finished in Vieux Fort, three or four boats from that community would come every day to "cultivate" (harvest) sea eggs in Laborie Bay. He then added that harvesters would come from as far away as Martinique. When asked whether Laborians tolerated the exploitation of sea eggs by others, he said that back then "there was a multitude of sea eggs, so there was no trouble for that."

All of this seemed to change after Hurricane Allen devastated St. Lucia in 1980. A fisherman reported that the storm ripped up the sea grass beds and reefs leaving the litter washed up on the beach. After this, sea eggs were scarce until they began to reappear in 1986. A diver reported that often times when eggs are scarce, they can still be found clinging to the undersides of reefs, “places people will not stick their hands,” but that after Hurricane Allen even the urchins in these inaccessible spots were gone. Hurricane Allen was the accepted explanation for the disappearance of sea eggs by almost everyone interviewed in this study. However, one diver believed that reports of the impact of Hurricane Allen on the sea egg population might have been exaggerated as only shallow water areas were affected.

Although the destruction caused by hurricanes was mentioned as the primary reason for the disappearance of sea eggs, local residents suggested other reasons as well. One older fisherman who continues to make and set fish pots was unsure why sea eggs disappeared in the early 1990s, but suggested that it might be due to more chemicals in the water. Another harvester was emphatic in his belief that declines in sea eggs were due not to overharvesting, but to the polluted run off from the island’s rivers. He explained that banana agriculture was at its peak during the 1980s and 1990s and that farmers applied liberal amounts of agrochemicals to bananas and other crops. He made his case by explaining that most banana farmers do not look at the labels on the agrochemicals, "if it says one cup, they put 2 or 3 cups. They think that will make it better.” He then described how the currents carry the run off from St. Lucia's many rivers, moving the agrochemicals (fertilizers and pesticides) around the island where they settle on reefs and the sea bed. He added that garbage from households is frequently dumped in rivers as well, and also contributes to sea egg mortality. Another harvester linked the decline in sea eggs after Tropical Storm Debbie to run off but also mentioned increased demand for uncooked sea egg roe from the island’s hotel industry.

Local residents agreed that before 1980 sea eggs in the Laborie Bay area could be collected by anyone without problem. An older pot fisherman stated that it was not possible for people from Laborie to harvest all the sea eggs. He illustrated his point by explaining that "If I am a St. Lucian I can go anywhere to work, I can go to Choiseul. To me yes, any St. Lucian can take them." He also described how an area just south of the Pitons has an abundance of flying fish and that even people from Martinique could come to catch them. "There was no trouble, no complaining during that time." He added however, that "If people from Martinique came now, it might be different. People are wiser now, and people nowadays like to complain." Another local harvester made a similar comment, suggesting that if people from other places come to harvest sea eggs now "there might be a little quarreling."

While a couple of residents acknowledged the possibility that the open access enjoyed by people in the past could be problematic in the future, no one suggested that the sea egg fishery should be closed to local use only. Instead, they discussed whether and how the resource should be managed. Discussions with local residents and harvesters in late May 2000 indicated their awareness that the current ban imposed by the Department of Fisheries was having its intended effect. A harvester commented that "they wouldn't have so many if they (Fisheries) didn't do this." Others agreed. When asked why they are abundant now, one informant said “I don’t know why they are back, but Fisheries stopped them [from harvesting] and now they’re back.” Another harvester explained that one must get a license from

Fisheries to dive for sea eggs and that no licenses were issued the year before. When asked if that was a good thing, he said "yes, because there are not enough." Some fishermen stated that while sea eggs are obviously more abundant than they were three or four years ago, their numbers are still much lower than they were in the days before Hurricane Allen. In support of this, it was said that in those days raised fish pots would be covered with sea eggs and fishermen would often break a few as bait before lowering the pots back into the sea. These days, raised pots do not have sea eggs on them.

When the initial interviews were conducted in May, 2001, there was some disagreement about when the ban should be lifted and licenses issued. One long-time fisherman explained that there were already lots of sea eggs just “behind the reef” and that the season should be opened. A commercial conch diver reasoned that there should be a harvest in mid 2001 in case a hurricane would come later and destroy the sea egg fishery. Although others agreed that sea eggs were reappearing in Laborie bay and the adjacent coastal area, they seemed more cautious, suggesting that it might be premature to lift the ban. A lifelong resident and fisherman who harvested sea eggs as a boy cautioned that the ban should be left in place for two more years. He also expressed concern about the pollution in the bay explaining that while the sea eggs are abundant in some areas there are very few near the mouth of the ravine in the southeast corner of the bay. Another harvester stated that "They shouldn't release the ban as yet. When they release the ban people will just be greedy. You have to have somebody in charge." When asked why, since this did not seem to be a problem in the past, he concluded that "in the past it was not a problem because we had an excess of sea eggs.”

Residents agreed that there needed to be some form of management to protect the sea egg resource and, as described above, most seemed satisfied with the efforts of the Department of Fisheries. A fisherman explained his position stating that although people would decide when sea eggs were ripe in the past, Laborie divers (harvesters) would not defy a government-imposed ban. "I believe it is now better for Fisheries to control. People will obey because there is a fine. In these days, people won’t listen. They would say, man who are you? But who is Fisheries is different."

Some sea egg harvesters suggested that the resource may not be as easy for a community to manage now as in the past, due in part, to the increased need for cash income. As one man explained, “Nowadays everyone is looking for money, it may be harder to manage.” This comment and other similar remarks express the sense that times have changed.

There is evidently a diversity of opinions on some aspects of the sea egg resource and its management and the study will continue to document this popular knowledge and to verify it wherever possible. The return of the sea egg stocks around the southeast of the island to potentially harvestable levels will provide the opportunity to monitor both the evolution of institutional arrangements for management and the response of the stocks to prevailing harvest regimes.

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