Co-management of the White Sea Urchin Resource in St. Lucia.

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Introduction

Fishing has been an important part of man's adaptation to the natural environment of the insular Caribbean from pre-Columbian times. It is important to the livelihood of island residents, and provides a local source of protein. The distribution of fish was, traditionally, part of a very localised system of exchange among insular Caribbean residents that often did not involve money. Fish is now obtained mainly using money as tender, but in rural areas the cash that flows from such transactions is rarely included in national economic accounting.

Recent developments in fishing in the insular Caribbean have tended towards gradual increases in production and effort. This is caused by increasing demands from growing populations and expanding tourist markets. The transformation from a traditional but coherent industry to one that focuses on maximum harvesting, has caused noticeable declines in the fisheries resources of many Caribbean islands.

In response to such declines regional governments have developed management plans for a number of fisheries resources, but many of these plans were designed without sufficient consultation with users of the resources. The effect of some of these plans has been an exacerbation of the declines in some fisheries resources, and an increase in social inequalities among traditional fishermen (Berkes & Shaw, 1986).

This study reviews the development of a management strategy for the exploitation of the white-spined sea urchin (*Tripneustes ventricosus*) on the island of St. Lucia. The strategy was developed in response to a situation of continued overharvesting, which had resulted in Government's closure of the fishery to allow the recovery of the stock.

Background

St. Lucia is one of the few Eastern Caribbean islands where the white-spined sea urchin is harvested for food, the others being Martinique, Barbados, Grenada and St. Vincent and the Grenadines (Figure 1). The urchin is called a sea egg in English, and *chadon* in St. Lucian creole. Both male and female sea eggs are harvested by divers using diving masks, snorkels and sometimes fins. The divers either swim from shore, or dive from traditional wooden canoes. On shore the gonads are removed and cooked over a fire.

Sea eggs are relatively easy to exploit; they are slow-moving, easy to handle because of their short spines, and they are most common in shallow coastal habitats, where the penetration of light is sufficient to allow growth of algae and sea grasses (Hunte, 1989). However, habitat is limited because of the island's narrow submarine shelf (513km^2) and the consequent scarcity of extensive seagrass beds.

Although sea eggs have been harvested in St. Lucia for many generations (J. Samuel, retired fisherman, 1991, pers. comm.), no statistics have been collected on the fishery. It has generally been open access with no regulations, but attracted the administrative attention of St. Lucia's Department of Fisheries (DOF) when the resource appeared threatened by commercial harvesting in the early 1980's (Smith & Berkes, 1991; V. Charles, DOF, 1991, pers. comm.).

The Pre-intervention state

Sea eggs were traditionally harvested by families and groups of friends, for their own use, especially during picnics at the beach, or by the children of fishermen, who spent a significant part of their summer holidays assisting and/or awaiting the return of their fathers from their fishing trips (Mrs. Francis, older fisherman's wife, 1991, pers. comm.). Older fishermen also reported landing large sea eggs occasionally, as incidental catch in their beach seines, or attached to their algae-encrusted, near-shore fish traps.

The localised harvesting and use of sea eggs began to change, particularly on the southeast coast of St. Lucia, in the early 1960s. That change included a modest trade in cooked sea egg between some harvesters in Vieux Fort and visitors from other parts of St. Lucia (V. Charles, 1991, pers. comm.). The level of harvesting appeared to have been sustainable until 1983 when it became a year round activity in response to dramatic increases in demand and price, which resulted in a significant decline in stocks by 1986 (Smith & Berkes, 1991). Following the depletion of the sea egg populations, the traditional harvesters from Vieux Fort appealed to the St. Lucia Fisheries authorities for assistance in controlling harvesting activities (S. Jennings-Clarke, DOF, 1991, pers. comm.).

Institutional background

There is a high degree of official commitment to manage the marine resources of St. Lucia. Under the Fisheries Act of 1984, DOF was vested with the legislative authority to promote the management of development and conservation activities in the exclusive economic zone, territorial sea, and internal waters of St. Lucia (Appendix 1). Under the National Trust Act of 1975, the St. Lucia National Trust also has a complementary mandate to promote and preserve the submarine areas of St. Lucia for the benefit and enjoyment of the State. DOF takes the lead role in administering the legal authority over conservation and development activities that affect the fisheries resources and it is assisted, when required, by the St. Lucia National Trust. DOF also benefits from the official cooperation of the national Development Control Authority on the minimization of potentially damaging coastal developments, and from technical assistance from local and regional non-governmental organisations (NGOs). It is also possible under the Fisheries Act to designate an area as a local fisheries management area, and to designate a local group such as a fishermen's cooperative or association as the Local Fisheries Management Authority.

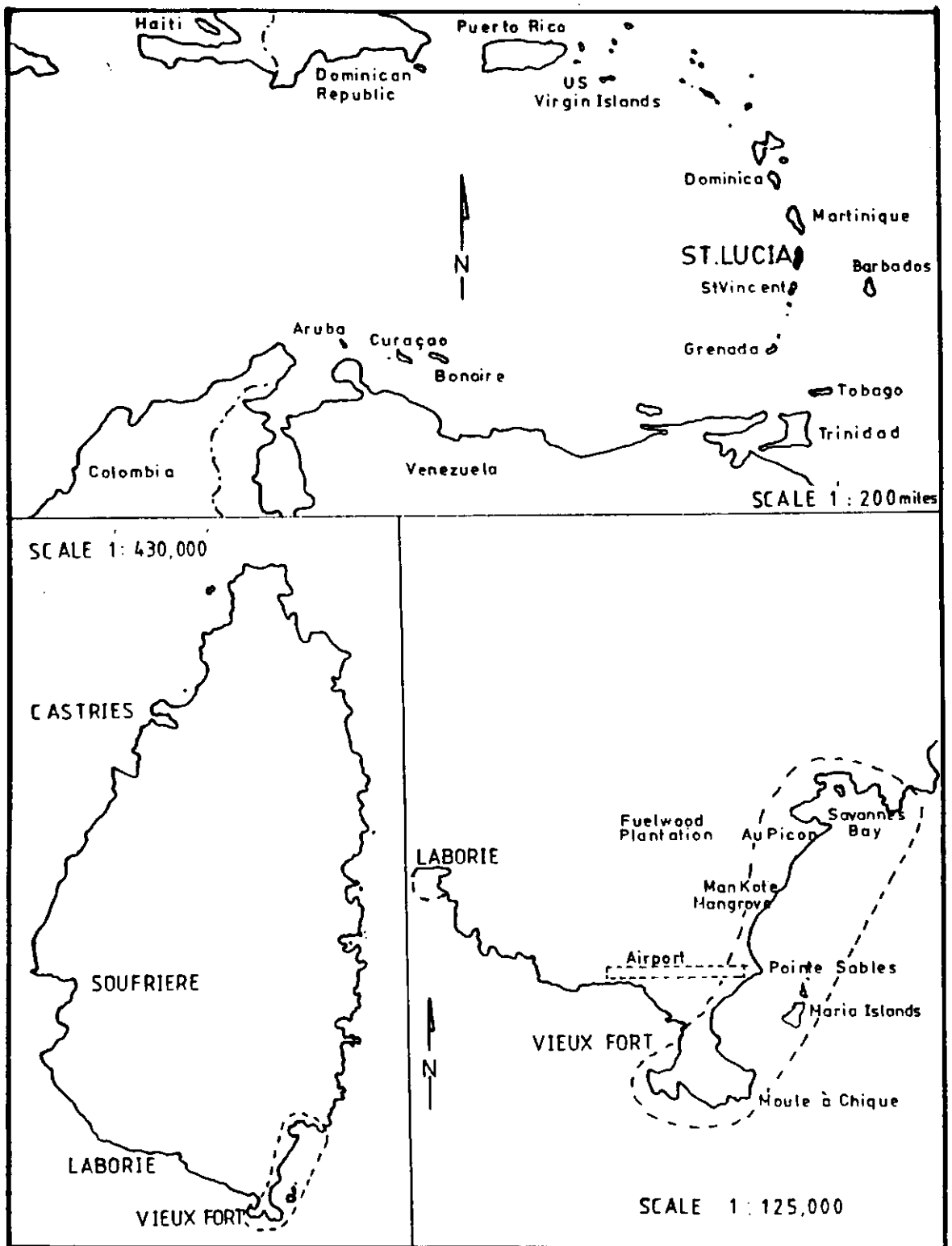

Figure 1 Location of the project area

KEY
----- Project area

A high level of commitment is also evident in the cooperative efforts of many of the users of those resources and NGOs. Very instructive examples of public and private cooperation and commitment in natural resource management and development emerged from a study of conservation and development requirements for the southeast coast of St. Lucia (ECNAMP, 1983). The case of the commercial cultivation of sea moss (*Gracilaria* and *Hydropuntia* spp.) by groups of residents on St. Lucia's southeast coast (Smith, 1990), is one example of public and private cooperation in the conservation and development of a natural resource. The attempts to use the sea egg resource of St. Lucia sustainably, which is the subject of this study, is another example.

Smith & Berkes (1991) reported the existence of an informal community management system in Laborie, that has not only combined seasonal harvesting of sea eggs, with entry limited to the immediate community but has also kept the resource sustainable for at least six decades. The Laborie community regulates the use of the resource without vested legal power, but it may be possible for them to become the Local Fisheries Management Authority under the Fisheries Act.

Assessment of property rights regimes in force

At the start of the period covered in this case study, there were no formal regulations governing the sea egg fishery. The study revealed the existence of effective community management at one location, but the fishery was open access elsewhere.

Rationale for activity

There are no estimates of the size of the St. Lucian sea egg resource or of the volume and value of the total annual harvest. There is, however, empirical evidence that the resource declined as harvesting patterns changed from seasonal to year round (Smith & Berkes, 1991; K. Nichols & S. Jennings-Clarke, DOF, 1991, pers. comm.).

The evidence and observations in this study were derived almost exclusively from the southeast region of St. Lucia firstly because it lies within the scope of CANARI's continuing Southeast Coast Project, and secondly because it is the most important harvesting area on the island. Sea egg populations have also been observed in other areas, including Micoud, Dennery and Labrelotte Point, where suitable substrate and water quality conditions exist (Nichols, pers. comm.; pers. obs.). However, because the commercial sea egg fishery is relatively new, there were no data on any aspect of distribution, stocks, or landings, that could be used as a basis for management decisions.

The lack of information, and the sea egg's vulnerability to overharvesting, provided the rationale for management intervention.

Objectives.

The main aim of the project described in this study is to establish a system of co-management of the sea egg resources on the island of St. Lucia. The general objective sought by the co-managers was the environmental and economic sustainability of the resource. To achieve this, the following specific objectives were sought:

- active monitoring and research into the harvesting of the sea egg resource of St. Lucia over the long term;
- active participation of the harvesters in the sharing and analysis of the gathered information;
- incorporation of contributions from the harvesters, wherever it is practical, into the design or modification of sea egg management activities;
- support of community-based traditions of resource management whenever they are encountered;
- cooperative mechanisms for management.
- active management of the resource by the harvesters, when it becomes feasible, with DOF overseeing their activities.

Case history.

The sea egg stocks in the southeast of St. Lucia were severely depleted by hurricanes in 1979 and 1980. By 1983 they had begun to recover, after which they were harvested year-round in many areas, without controls.

In 1986, CANARI began a research programme, in collaboration with DOF, to determine the status of sea egg populations at selected sites on the southeast coast of St. Lucia. During 1987, this study became part of a regional programme to investigate the life-history traits of the species in St. Lucia, Grenada and Barbados, co-ordinated by the Bellairs Research Institute of McGill University and the University of the West Indies, both in Barbados.

Three sites were chosen in St. Lucia, Aupicon and the Maria Islands Nature Reserve, near the town of Vieux Fort, and Laborie Bay. Each month, data were collected on population density, size distribution of the populations, and reproductive status. Sea egg divers were employed part-time to assist with the fieldwork.

In December, 1987, DOF closed the sea egg fishery, considering the obvious overharvesting and decline in stocks, and CANARI continued to study the three southeast coast populations. These sites are similar in that they consist of shallow seagrass beds that are typical sea egg habitat, and that they have been harvested for many years. However, they were under very different regimes. The Maria Island population was within the boundary of the Maria Islands Nature Reserve, the harvest of the Laborie population was managed by the Laborie community and protected against encroachment from outside, and the Aupicon population, which is not adjacent to a town, was effectively open-access.

At Maria Islands and Laborie, the study confirmed in 1987 and 1988 that the peak of reproduction by the sea egg is in the fall, and the peak of recruitment in early winter. However, this pattern was not seen at Aupicon, where population level remained very low for both years, with no detectible annual recruitment. This difference is attributed to antecedent harvesting events, and not to differences among sites in ability to support populations of sea eggs. It was concluded, therefore, that the conservation efforts in the Maria Islands Nature Reserve and community management of the resource at Laborie had been equally successful in maintaining viable stocks, while the severe depletion of the Aupicon stock was the result of uncontrolled exploitation and the absence of any form of management.

Based on the results of this research, it was concluded that management of the sea egg resource of St. Lucia was possible:

(1) if effective local community systems based on the cooperation of the users exist;

(2) if local residents and users of the resource are involved in planning, designing and management of a reserve that include the said resource; and,

(3) if year-round indiscriminate harvesting of sea egg is curtailed.

In mid 1989, discussions were started among the sea egg divers of Vieux Fort, DOF and CANARI, to present the results of the research work, to determine the needs and concerns of the divers, and to plan a mechanism for shared responsibility for the management of the resource that would permit the re-opening of the fishery. The conditions that were agreed upon for controlled harvesting were as follows:

- the sea egg populations consisted of two size classes, which represented one and two year old animals and were readily distinguishable, and divers would harvest only the larger size class;

- as soon as the larger size class was fished out, a representative of the harvesters would report to DOF that the season should be closed;

- harvesting would only be allowed by divers who formally applied to DOF for licences prior to the opening of the season each year;

- before the opening of the season each year, divers would assist in carrying out surveys to verify that stock levels were adequate.

The first trial, in late 1989, was partially successful. Approximately 15 divers applied, as a group, and were granted permission to harvest. However, unlicensed divers also began harvesting and the available stock of larger sea eggs was fished out in a matter of weeks, and duly reported by the licensed divers. It should be noted that the divers of Vieux Fort had always operated as small independent groups prior to 1989, and that the participation in the various planning meetings, agreement on common goals and activities, and joint application for licenses, represented a new development in the community.

Meetings with the Vieux Fort divers were continued in 1990, to address problems encountered the previous year. An important concern of the divers was the question of enforcement of the regulations, to ensure that unlicensed divers did not counteract their management efforts. Part of the solution was the issuing of identification cards to licensed divers.

For the 1991 season, it was agreed that both the divers and the vendors would be licensed, and DOF announced in the press that it was embarking on a community-based management approach to the harvesting of the resource (The Voice, 1991). Twenty harvesting licences were issued to Vieux Fort divers for the start of the season in the second week of September.

Lessons Learned.

1- There are cases of self-imposed regulations and collective management actions for common property resources, and such cases offer excellent opportunities for the formulation of new and improved management regimes to respond to increasing demands on the resource base.

The case from the community of Laborie illustrates that local management of a resource can be well established, but its effectiveness may not yet have been recognized by management authorities. Once the effectiveness had been demonstrated and documented, it was important to ascertain precisely what management practices were operating. In Laborie these included the restriction of access to the resource, observance of the seasonal restrictions, and a limit on the duration of the harvest each season. These practices were incorporated in the development of the strategy for the management of the stocks targeted by the divers from Vieux Fort.

2- Resource users can participate effectively in co-management arrangements only to the extent that their interests are represented and that they are organized as a group with a common goal.

During the course of the research on the population dynamics of the sea egg in the southeast of the island it was apparent that, with the exception of the case of community management of the Laborie harvest, the resource was being exploited by independent individuals or small groups who were essentially in competition with one another for a common resource. A significant event in the formation of a harvesters' group was the joint application for permission to participate in the first trial harvest after the nationwide closure of the fishery. However, the maintenance of the group structure remains very dependent on an NGO (CANARI) to provoke meetings, to advocate needs, and to assist in meeting the government's requirements for licence applications. Much work, therefore, needs to done in support of the sea egg divers' group to establish a common goal and to ensure that they acquire the confidence and skills to assume CANARI's present role of representation and animation.

3- There is a need to combine scientific knowledge and popular perceptions in the formulation of management plans, through a continuing exchange between managers and resource users.

From the discussions among researchers, managers and divers
it transpired that the divers were aware of a number of characteristics of the sea egg populations, but not of their significance. Thus, sharing of the results of the research that had been carried out explained a number of the divers' own observations, and harvesting restrictions based on the research were therefore readily accepted. A number of key aspects in the evolving strategy of co-management have depended on such restrictions.

4- In the case of scarce or diminishing resources, co-management arrangements require that access be restricted and that the number of users be limited.

One of the principal provisions of the regulations introduced in 1990 and 1991 for the management of the resource is the restriction of access to recognized harvesters. This restriction served two purposes. Firstly it excluded the more occasional users of the resource, those who were not sufficiently concerned about this source of income to be involved in the planning meetings, but whose numbers represented a potential threat to the embryonic co-management strategy. Secondly, it was one of the early influences in generating a sense of community in the group of licensed divers, and in enhancing their self esteem as the professionals in what had previously been a relatively marginalized activity.

5- In cases where the resource has been used without control, and with no restriction on access, new arrangements for community-based management demand that the community of resource users be built and strengthened around shared benefits, common goals, and the mandate of stewardship over the resource in question.

To adopt a common goal where none has existed before, it is essential to establish a sense of community among the participants and to strengthen any functional links that exist among them. Specific activities must be designed and implemented to reinforce the cohesion of the group, and to enhance their status in their community. In such cases, the spirit of pride and self-esteem which can be instilled from being recognized as stewards of the resource also aids in developing and maintaining a sense of responsibility, which is already apparent in the case of the sea egg divers.

6- The formulation of co-management arrangements requires that the roles of the various interest groups be properly defined, and that they be allowed to participate formally.

At present, there is no formal agreement for management, which leaves all responsibility for regulation in the hands of the government department. Although self-regulation of the harvest of sea eggs above a certain size limit has been practised relatively successfully, the responsibility for this regulation has not yet been formally transferred to the group of divers. While the various roles are well defined, the lack of formality could allow the management conditions to evolve contrary to the interest of one of the parties. In addition, formal provision for self-regulation would enhance the users' autonomy and sense of stewardship over the resource.

7- The implementation of co-management arrangements requires that communication and collaboration among all the actors be maintained.

The need for continued communication was particularly evident in the present case, where the trial co-managed harvests have lasted for only a few weeks each year. This implies that there are long intervals between harvests, when the momentum of collaboration could be lost. Meetings were therefore held after each harvest to determine how successful the management arrangements had been, and to gather recommendations for changes and modifications for the future. Prior to the following harvest season, planning meetings were also held to reach agreement on conditions and procedure, based on the previous year's experience.

8- Co-management arrangements are easier to conceive and implement when the resource is small and well-defined.

The fact that the sea egg fishery involves a single species has been a great advantage and has simplified the research and management effort. Development of a similar strategy for co-management of a multi-species reef fishery, for example, would be more difficult. In addition, the distribution in discrete and recognizable populations has greatly aided the control of access.

9- Experimental projects which demonstrate novel approaches to management can have significant impacts on national policies and programmes.

While the concept of community-based management has been generally acknowledged as desirable, there are few examples of formal transfer of management responsibilities to communities in the insular Caribbean. Prior to the present case, there had been no declared policy of co-management of any marine resources in St. Lucia. The adoption of such an approach for the management of sea urchin resources is therefore significant, and follows the development of an effective co-management strategy and testing its implementation over the past three years.

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Appendix 1

Fisheries Act of St. Lucia. (#10 of 1984)

Section 18:

Local Fisheries Management Areas

(1) The Minister may by notice publish in the Gazette -

(a) designate an area as a local Fisheries Management area;

(b) designate any local authority, fisherman's co-operative or fishermen's association or other appropriate body representing fishermen in the area as a Local Fisheries Management Authority for that area.

(2) Where there is no appropriate body representing fishermen in the area, the minister may promote the formation of such a body.

(3) The Chief Fisheries Officer shall, to the extent he deems it practicable, provide to any Local Fisheries Management Authority, such assistance as may be reasonably necessary for the performance of its functions.