

A New Participatory Approach Towards Sea Urchin Management In Saint Lucia, West Indies

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ABSTRACT

After a period of closure brought about by excessive harvesting of sea urchins, the Department of Fisheries adopted a new, participatory system of sea urchin management in an attempt to avoid the overexploitation of the past.

This new system involves the issuing of harvest permits to persons who have completed a number of requirements and have agreed to harvest under certain conditions specified by the chief fisheries Officer. Requirements include: assisting in the annual preharvest monitoring and assessment of the sea urchin resource, participating in meetings to assess previous harvests, discuss recommendations to upgrade the system, and lectures on health related aspects of food preparation and the biology of the animal.

The structure of the legislation relating to this resource allows for the development of such participatory management. It allows the management authority to select only individuals who have proven themselves concerned with the welfare of the resource. It also allows annual review of the permits granted so that persons have to qualify annually in order to be considered. In addition there is scope to adjust the level of effort (number of divers, period of harvesting) to the level of the resource each year.

The system is now in its fourth year, and has continued to evolve each year. Conditions have been added and reviewed, making the system more effective. Mechanisms have had to be devised to deter illegal harvest and encourage involvement of licensed harvesters in surveillance of their harvest area.

With the apparently poor recruitment of juveniles during the past year, it has become apparent that annual adjustment of the size limit is essential as a means of insuring sufficient individuals remain in the water to attract new recruits. This poor recruitment following the harvest of 1992 has forced the temporary closure of the main southern harvest area this year.

INTRODUCTION

The White Sea Egg (*Tripneustes ventricosus*) has long been considered a marine delicacy in the Caribbean island of Saint Lucia. Like many of their island neighbours, Saint Lucians prize the gonads of this large littoral sea urchin, which are either eaten raw, or stuffed in the urchin test and baked on the beach. This fishery provides an important seasonal source of income for coastal communities which are adjacent to seagrass and fringing reef habitats. The species is short lived with a maximum of two year cohorts present in a population at any one time. The larger of the two comprises the spawning population (Lewis, 1958; Smith, 1991). Sea urchin fisheries throughout the Eastern Caribbean region tend

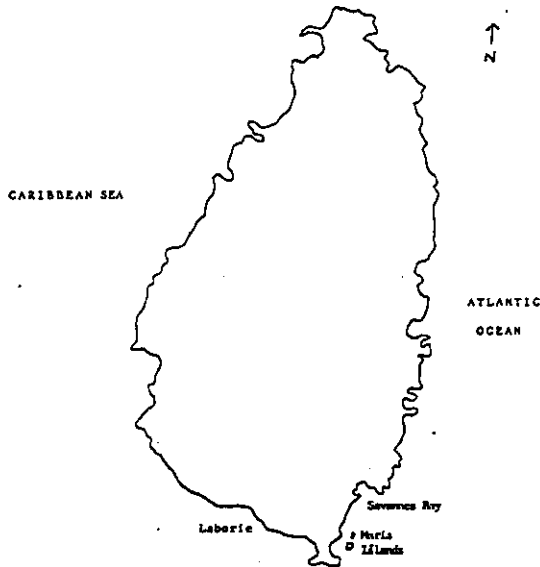


Figure 1. Location of Study Sites for Sea Urchin Population Assessment.

to commence around September each year, with the larger size class providing the harvestable animals.

Being easily accessible, the Saint Lucian fishery had reached unacceptably high harvesting levels by the late 1970s and the additional stress of successive hurricanes in 1979 and 1980 caused its collapse. The population returned to harvestable levels by 1984, but indiscriminate exploitation resulted in the collapse of the fishery that same year. The Department of Fisheries decided that a moratorium on the fishery was the only solution to ensure the recovery of stocks. This was implemented the same year.

In 1986, the Eastern Caribbean Natural Area Management Program (ECNAMP), a locally based regional agency (now called the Caribbean Natural Resources Institute- CANARI) started a study of three of the most economically important sea egg populations in St. Lucia. These are located off Aupicon (Vieux Fort), west of Maria Islands, and in Laborie (Figure 1). The Aupicon area comprises an extensive population located on seagrass beds inshore of a broken patch reef system. The Maria Islands population is included within the Maria Island Nature Reserve (protected since 1986). This stock was very heavily fished prior to its protection. The Laborie stock is found offshore of this small coastal village and has traditionally been utilized less.

The objectives of the ECNAMP study was to provide much needed biological information for management. It produced information on size

frequency distributions, urchin densities, natural mortality and gonad development for the three distinct areas (Smith, 1991). Data indicated two clear size classes (or cohorts) for each area, and monthly samples showed modal progression. Sea Urchin fisheries exploit the larger, adult cohort, leaving the juvenile size class to provide the fishing stock for the subsequent year.

The study also demonstrated an inverse relationship between levels of fishing pressure and densities, and recruitment was not seen in the most heavily fished site. Reopening the fishery in 1988 provided an opportunity to remove open access to the fishery which had so easily facilitated overexploitation of the resource in previous years. The nature of the resource also appeared to lend itself towards facilitating a system of community-based management.

The new fishery management system requires that persons eligible for harvesting sea eggs acquire a permit from the Chief Fisheries Officer. Regulations for this fishery (Appendix 1) allow for the degree of flexibility required to tailor management on a yearly basis so as to respond to the annual variability of this highly susceptible resource. The permit and attached conditions allow for the control of harvesting effort (through the number of permits issued and the period length of harvesting). The option to add conditions to the permit allows for annual review of the license agreement. This has proven essential to the viability of this management system.

With the reopening of the fishery in 1988, the potential resource users shared the Department's hope that the observed earlier cycle of recovery and collapse would be prevented by responsible resource use and management based on the newly acquired knowledge of the resource. The current management system is a product of the needs and concerns expressed by the harvesters during preliminary discussions with the Department of Fisheries. The harvesters recognized that their individual areas needed protection from indiscriminate harvesting and that fishing effort would have to be tailored to the annual abundance of the resource.

The management system devised from such consultations has evolved into one that regulates on an annual basis: (a) the number of persons harvesting sea eggs, (b) the extent and ownership of each harvest zone, (c) the minimum size limit for each year's fishery, (d) a maximum harvest period, and (e) the means of disposal of urchin remnants (Appendix 2). The requirements for seasonal licensing are (a) attendance at meetings to discuss the biology of the species and license conditions (which may be adjusted based on the effectiveness of the management system during the previous year), and (b) assistance in pre-harvest population surveys for generation of size frequency and density data for determining maximum fishing effort and the appropriate minimum fishing size limit. All potential "cleaners" (persons who will assist harvesters with gonad preparation on shore) are also required to attend the pre-harvest meetings.

The minimum fishing size limit should be reassessed on an annual basis. St. Lucia has used a minimum test diameter of 3.5 inches. Perspex rulers are

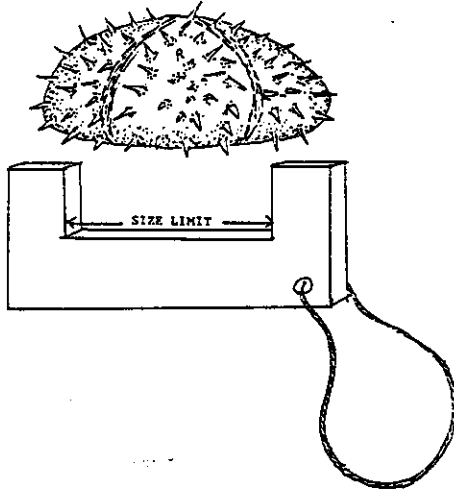


Figure 2. Ruler Used to Measure Size Limit for Sea Urchins (animals larger than limit can be fished).

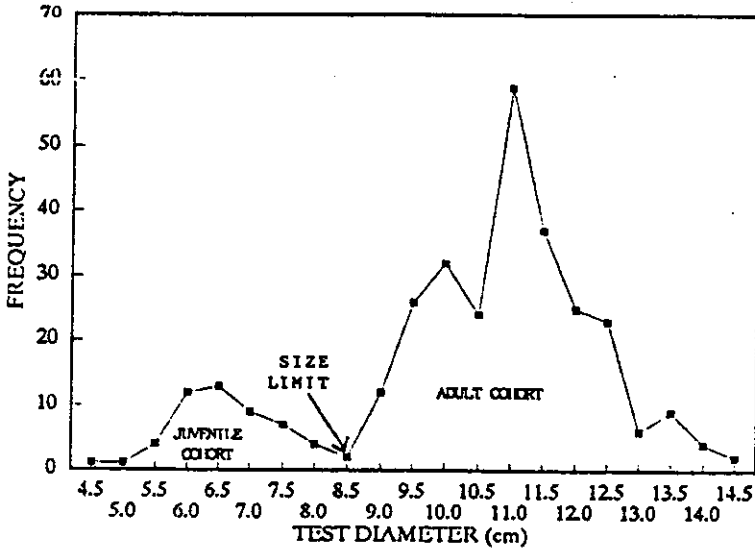


Figure 3. Determination of Size Limit from Length Frequency Data

distributed to divers enabling quick measurements to be taken underwater to determine whether the urchins are of a marketable size (Figure 2). The minimum size limit is derived from the results of population studies. Length frequency data (*i.e.* measurement of test diameter of individuals sampled throughout the proposed harvest zones) may be used to generate frequency histograms which will often reveal the two cohorts (juvenile and adult). The minimum size limit should be set high enough to protect the entire juvenile cohort (Figure 3).

If population surveys indicate a lack of juveniles (*i.e.* very few representatives of the smaller size class within the sample), it is safer to either set a higher size limit to protect a substantial part of the adult population or not to open the fishery. Either strategy should ensure adequate recruitment of juveniles to the area later on in the year (sea urchin larvae appear to be attracted to areas where adults of the same species already exist (Smith, 1991)). No harvesting was allowed in St. Lucia during 1993 since low recruitment was evident at all potential harvest areas, including those which had not been harvested during the previous year. The involvement of the divers in the 1993 pre-harvest population surveys and their deep awareness of the biology of the animal ensured no resistance to this management decision on their part.

The exact commencement date for harvest periods must depend on gonad maturity. This measurement should, therefore, form part of the pre-harvest survey. Experienced sea egg harvesters can be used to identify the appropriate stage of development for harvesting. The starting date for harvest periods from 1988 to 1992 ranged between mid August to late September, depending on this factor. In addition, commencement dates for different zones can differ by as much as three weeks for the same year.

During the first year of renewed harvesting, illegal exploitation was rampant. At the request of authorized harvesters, the Department withdrew permits after one week of harvesting since by that time, stock sizes had already been reduced to the minimum allowable limit. Harvesters and cleaners are now required to obtain photo identification cards in order to sell the sea egg product and consumers are required to purchase only from individuals with such ID cards. This has significantly reduced the level of illegal harvesting. Surveillance assistance from law enforcement officers is augmented by the authorized harvesters, who eagerly provide enforcement within their harvest zone.

In 1992, at the end of the harvest period population surveys indicated some further scope for harvesting. Authorized divers, in consultation with the Department of Fisheries, developed a system of merit to select fifteen divers (from the thirty five authorized divers) to continue for an additional two weeks. Divers were ranked based on each individual's involvement in surveys, their early application for permits, as well as their strict adherence to the conditions of harvest. This allowed the Department to take a back seat during this sensitive decision and yet ensure conservation of the resource.

DISCUSSION

Many nearshore fisheries resources lend themselves well to management systems which revolve around involvement of the user community rather than government management. In the Caribbean the tendency is often to place the burden of enforcement and management on national authorities. This often proves impractical with regards to fisheries concerns, since most illegal activities occur either in isolated coastal areas or offshore. The sea urchin fishery experience in Saint Lucia clearly demonstrates that a user group can become actively involved in the central aspects of resource management and play an important role ensuring its sustainable exploitation.

Countries with sea urchin fisheries should adopt such a co-management system. Unlike other nearshore fisheries, sea egg fisheries exclusively remove the ripe individuals, making the resource particularly prone to overfishing. It is important that traditional fisheries management measures, such as fixed close seasons and size limits are avoided since they are inappropriate due to the peculiar biology of the species. This system of management will work under conditions where the user community has sole access, proximity to the resource, and where the resource is sufficiently small to be managed by the group. The fundamentals of such a system of management are:

1. joint negotiation and development of the system with the involvement of all relevant parties;
2. establishment of zones (in effect, "gardens") which can be nurtured by a particular user community;
3. potential harvesters being selected annually based on their involvement and performance during the previous year;
4. annual review of the size limit and limit on effort based on the current status of the resource within each zone;
5. the start of the harvest period based on the stage of gonad maturity within each zone;
6. the harvest period ending when the harvestable population size limit is reached (*i.e.* when no more urchins above the minimum size limit are found).

CONCLUSION

Many aspects of this management approach may be suitable for other nearshore fisheries such as lobsters, conch, and seaweeds. These fisheries have, however, enjoyed a greater degree of open access in the past and zoning system may be more difficult to implement and enforce. Nonetheless, such resources are also highly dependent on the status of nearshore habitats and their role as juvenile nurseries. Thus, a system of management where resource monitoring and protection becomes a major responsibility of the resource users can greatly assist in sustainable development of these fisheries.

ACKNOWLEDGEMENTS

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Appendix 1

Fisheries (Lobster, Turtle and Fish Protection) Regulations Section No. 10 of 1984

Prohibition against the disturbance of sea urchins	No person shall disturb, damage, take from the fishery waters, have in his possession, purchase, expose for sale or sell any sea urchins - except with the written permission of the Chief Fisheries Officer, and in accordance with any such conditions which he may specify
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Appendix 2

License Conditions for Vieux Fort Harvesters in 1992

In accordance with Regulation 7 of the Fisheries (Turtle, Lobster and Fish Protection) Regulations, Statutory Instrument Number 67 of 1987, permission is hereby granted to you to take from the fishery waters, have in your possession, expose for sale or sell sea urchins of the species *Tripneustes esculentes* (the White Sea Egg).

This permission is non-transferrable, and is granted based on your compliance with the following conditions:

- a) you shall not harvest any urchins with a body diameter of less than 85mm (3 1/4 inches);
- b) you shall only harvest from areas between Savannes Bay (Saltibus Point) on the south-east coast and the Marina (Il Pirata);
- c) you shall ensure that persons who are authorized to work with you as cleaners bury urchin shells and remnants on a daily basis, placing them above the high tide mark and covering them with at least six inches of sand;
- d) you shall make available to the Department of Fisheries any data on sizes and weights, as requested;
- e) you will provide the Department of Fisheries with daily estimates of your sea urchin landings
- f) you shall not remove any urchins from the Maria Island Marine Reserve;
- g) you shall not export any urchins without previously acquiring the required export license.