Popular knowledge and science: using the information that counts in managing use of a mangrove in St. Lucia, West Indies

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August 2000

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Abstract

Mankote mangrove in St. Lucia has traditionally been an important source of fuelwood. The area was declared a Marine Reserve in 1986 and a small group of people have continued to produce charcoal from mangrove trees under an informal co-management agreement with Government that includes sole access rights and an agreed set of harvesting practices. The charcoal producers group participates in monitoring the quantity of charcoal produced, and trends in the size and abundance of the harvested species. A recent initiative aims to test the effectiveness of some standard silviculture practices in enhancing productivity. The paper discusses the participation of the producers group and management agencies in developing the management plan for the mangrove, the current collaborative monitoring and research activities, and the development of additional income-generating activities for the producers group.

1. The mangroves of St. Lucia

For nearly 20 years, the Government of St. Lucia has recognised the need to conserve mangrove ecosystems. In 1986, most of the island's mangroves were declared Marine Reserves under the Fisheries Act of 1984. More recently, a number of mangroves were identified as candidates for further protection through a proposed System of Protected Areas for St. Lucia (Hudson *et al.* 1992). However, only the Mankote mangrove in the southeast of the island has had any active management. Mankote is a basin mangrove which covers 63ha within the Mankote Marine Reserve. It is the largest of the islands mangroves and represents 20% of the total area of the island's mangrove forests.

2. Use and management status of Mankòtè

Mankote appears to have been used almost continuously since the mid-Eighteenth Century,

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firstly as a source of fuelwood for the adjacent sugar plantations that existed at that time and for export to neighbouring countries, and since the Second World War as a source of charcoal used as cooking fuel. Mankòtè currently provides approximately 30% of the charcoal sold in the nearby town of Vieux Fort (Hudson 1997). Other uses include cattle grazing, fishing, crab hunting and recreation. By the time the area was declared a Marine Reserve, there was a willingness to test the idea that the impact of harvesting could be reduced to a level that was compatible with conservation objectives and charcoal production was permitted to continue. However, there was still little quantitative information on charcoal production and its effects.

The first study of the impact of charcoal production on biomass was carried out between 1986 and 199 1, and the results suggested that charcoal production could be sustainable (Smith and Berkes 1993). During the period of this study there was increase in the amount of charcoal produced each year, as well as an increase in the abundance of stems of the two harvested species (*Laguncularia racemosa* and *Conocarpus erecta*). These changes took place at a time when the charcoal producers were becoming increasingly involved in the planning of a management strategy for the mangrove, which included a change from the open access regime of the past and increasing management responsibility being given to the charcoal producers. This transfer of responsibility was made possible largely because the producers were becoming more organised, and had formed the Aupicon Charcoal and Agricultural Producers Group (ACAPG) (Geoghegan and Smith 1998). The increased cohesion and participation also meant that the Group's knowledge of the mangrove was recognised and incorporated in the planning process.

Of particular importance was their knowledge and application of harvesting methods that encourage regeneration, or coppicing, which is a key element of the sustainability of the harvest. These practices are incorporated in the draft management agreement that has been developed and which, while not yet formalised, continues to guide the day-to-day management of activities in the mangrove. The producers were also able to report on the inadequacy of a programme in which large quantities of insecticide were used in the mangrove for mosquito eradication, and the fact that unskilled cutting resulted in a high proportion of stumps which died without regenerating.

The objectives of the agreement are:

- to ensure the protection of plant and animal species that exist in the mangrove;
- to maintain the mangrove's ecological processes;
- to use the resources of the mangrove to maximise economic and social benefits;
- to develop and encourage a cooperative management initiative between the Group and government;
- to test and demonstrate techniques applicable to co-management and sustainable use of small mangroves in the Caribbean.

Key elements of the agreement include:

- the Group has sole wood harvesting rights;

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- minimum rotation cycle of two years;
- specific guidelines for cutting practices that permit regeneration (coppicing);
- cutting of trees is not permitted adjacent to water bodies;
- tourism activities will be led by trained members of ACAPG;
- ACAPG will assist with research and monitoring as appropriate;

3. Research and monitoring

These activities serve two purposes. The first is to determine whether or not the production of charcoal is sustainable, to guide management decisions, particularly in relation to access and levels of use. The second is to determine the effectiveness of applying some standard forestry practices to enhance the quality and quantity of wood, and the sustainability of harvesting.

Sustainability.

Charcoal production is monitored routinely by the members of the ACAPG. Charcoal leaves the mangrove in bags which average 45 pounds (20kg) in weight. The number of sacks produced by each member of the ACAPG is recorded by a group member each month and the data are reported to CANARI where they are entered into the database. To assess the effect of extraction on abundance and distribution of trees over time, a number of permanent circular quadrats have been established since 1999, using a stratified random sampling approach. Quadrats are 0.1 acres in area (0.04ha), and all trees above 1.0 inches dbh (25mm) are recorded. The plots are to be re-measured at least once per year, and more frequently when possible.

Enhancement

The mangrove has been used illegally for the cutting of poles used as supports in building construction. The poles are cut in areas of the mangrove where *Luguncularia racemosa* (white mangrove) develops tall straight stems. Given the evident demand for poles the ACAPG is presently considering marketing poles themselves, but the procedure for this has not yet been worked out. In anticipation of a system for marketing being put in place, experiments have been started to determine the effect of thinning coppices on the quality of stems produced. A series of plots have been established in which half of the stumps are thinned to leave three or four of the straightest stems, and half are left unthinned. The first of these plots will be ready for harvesting by late 2000. At which time the size and quality of stems from thinned and unthinned treatments will be compared, to determine whether thinning improves the yield of better quality stems suitable for use as poles.

The results of research and monitoring are redistributed to the Group through periodic meetings that are held by the management partners to address the many issues that affect their activities and their role as a partner in management.

4. Opportunities for field studies

The mangrove also provides opportunities for student projects and research, from high school

projects to graduate level research, and these have added greatly to the understanding of the mangrove system and the patterns of use. The first study of charcoal production in the mangrove was carried out by students of the Vieux Fort Senior Secondary School (VFSSS 1981), and this was is large part responsible for drawing attention to the importance of the resource and hence the need for management of its use. This was followed by a graduate study which outlined a strategy for sustainable use (Romulus 1987). A Masters dissertation provided the first detailed study of the socio-economics of the uses of the mangrove and its participatory management system (Hudson 1997). The study identified fishing as an important activity, and nutrient transport to inshore waters as an important function, neither of which had been documented at that time. To address this gap in knowledge, a graduate study has commenced in June 2000 focusing on the fauna and nutrient characteristics of the mangrove water body.

5. Discussion

A number of interesting points concerning participatory management arise from the case of Mankòtè mangrove. One of the most important is the fact that although the agreement has never been formalised, the collaboration appears to be effective in managing of the production of charcoal. The charcoal producers are largely responsible for day-to-day management, and while government agencies have played only a small part in this, they provide the necessary policy and legislative framework for it to succeed.

The establishment of an effective management system was largely due to a continued high level of involvement by CANARI over a number of years. However, CANARI is not a management agency and its intended role is one of learning and documenting the evolution of the case. Therefore there is a need to reduce its level of involvement. But a lead agency needs to be identified and at present the roles of management agencies are unclear. To address this situation, all relevant agencies have begun a process of establishing a working group whose first task is to clarify and define these roles and to design a new arrangement which will incorporate the various research, monitoring and technical assistance activities.

The availability of information, both from popular knowledge and research, has played a key role in the recognition of the importance of the resource. This was especially true at the initial stages of the management planning process when the charcoal producers were practically the only source of information on the history of area, and the impacts of past and current uses. The subsequent involvement of the producers in research and monitoring programmes has contributed to an increasing level of confidence and sense of responsibility among the Group members. Further, the implementation of management strategies is more likely to be successful when the resource users are involved in getting the information on which they are based. In conclusion, it is probably unlikely that charcoal production would have been permitted to continue within the Marine Reserve if there had not been a systematic process of data gathering and documentation in support of this management process.

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