MARINE SANCTUARIES AND CONSERVATION OF FISHERY RESOURCES

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ABSTRACT

The dwindling of coastal resources is of great concern to many developing countries. Critical habitats such as coral reefs, mangroves and seagrass beds make up the coastal ecosystems. These ecosystems are important for the wellbeing of people, coastal communities in particular. Coastal fisheries sustain many economies, coral reef associated fisheries supply 10 to 12% of the world's total fish landings. About 90% of fish landings in tropical developing countries comes from coastal waters and supplies 40% to 95% of animal protein consumption. Human activities have begun to degrade these ecosystems. Destructive fishing methods, over harvesting, pollution and sedimentation due to unplanned land use practices are the major causes. Several countries have attempted to arrest this trend by introducing various regulations to manage resource exploitation and by declaring marine protected areas. However, measures taken to protect and manage the resources have not produced the desired results, mainly due to the lack of involvement of the communities concerned.

1. INTRODUCTION

Natural resource management is not a new concept. In the past fishing communities had elaborate forms of resource management techniques, where they considered the resources as their own property and protected them from outside communities. This system functioned well in the past when population levels were low. However, the sense of ownership of resources has been lost in recent times due to the pressures of an increasing population. This has led to intensive harvesting of all living and non-living resources within reach. Natural resource management in the modem context attempts to rebuild this sense of ownership through a community participatory process.

The coastal zones are home for over 60% of the human population and are the sites for two thirds of the worlds large cities. About 90% of fish landings in tropical developing countries comes from the coastal waters and supplies 40% to 95% of animal protein consumption (Holdgate, 1993). The high productivity of tropical coastal waters is due to seagrass beds, mangroves and coral reefs. These ecosystems are the breeding and nursery grounds of many economically important species. The health of these ecosystems has been degrading rapidly during the past two to three decades. About 60% of the coral reefs in Southeast Asia and almost 80% of reefs in the Philippines and Indonesia have been damaged (Lundin and Linden, 1993). Destructive fishing practices, pollution and sedimentation have been identified as the main causes of habitat destruction (Wells, 1993; Holdgate, 1993).

Juveniles of economically important reef fishes, shrimps and crabs grow within the mangroves and seagrass beds. It has been estimated that 10—12% of the world's total annual fisheries catch comes from reef related fisheries. Some of the highly productive reef fisheries in the Philippines support an annual fish harvest of 30 t km^{-2} Fish catches from the surroundings of such productive reefs may reach 5000 kg per fisherman per year (White *etal,* 1994).

Although the status of critical habitats in the Southeast Asian countries is well documented, there is a dearth of information from the South Asian region. Sri Lanka, with a coastline of about 1700 kilometres supports highly productive ecosystems such as mangrove forests, coastal lagoons, estuaries, seagrass beds and coral reefs. These are important for national development and are rich in genetic resources.

Fish is the most important source of protein in Sri Lanka. This amounts to approximately 65 percent of the animal protein consumption and 13 percent of the total protein intake of Sri Lankans (Baldwin, 1991). Over ninety percent of the total fishing population in the country live along the coast. Fishing is concentrated in the coastal waters, classified as within 40 km of the shore (Baldwin, 1991). The harvests from coastal waters are several times more than the catches from the deep sea and offshore areas. There is evidence to indicate that many resources in the coastal waters are already over exploited (Ohman, et al, 1993; Lundin and Linden, 1993). The number of fishermen is expected to increase by 50 to 60 thousand by the year 2000 and a significant drop is expected in their per capita income (Joseph, 1993), due to the scarcity of resources in near shore areas.

The continental shelf of Sri Lanka is narrow, averaging only 25 kilometres in width and has a total area of 28,000 km^2. Sri Lanka has a tradition of fishing dating back several centuries. In the past fishing was carried out mainly by using non-motorised catamarans, dugout canoes and log crafis. Fishing methods used were mostly non-destructive. Angling, gillnetting and beach seines were the most common methods employed. With state assistance the fisheries industry was developed beginning from about the 1950s. This support was mainly in the form of fishing gear including nylon nets, glassfiber boats and outboard engines.

The greatest development of the fisheries sector was during 1977—1983, when fish production increased 8.4 percent, and even exceeded the overall growth rate and the growth of the agricultural sector during the same period (Joseph, 1993). According to the National Fisheries Development Plan (MFAR, 1990), the peak fish production occurred in 1983 when 220,806 tons were harvested. Exports of fish and other aquatic products reached a maximum in 1988 when the country earned 825 million Rupees (Baldwin, 1991).

In addition to the traditional fishing activities, collection of coral reef fish and invertebrates for the export market is of considerable importance. In fisheries export products, ornamental fish are rated as the third highest in volume and value after prawns and lobsters (Ohman *et al,* 1993; Joseph, 1993). Other fisheries and aquatic products from coastal waters are crabs, sea cucumber and various species of molluscs which are important for the local market as well as for export. More recently, with the development of the tourist industry, underwater recreational activities such as snorkeling and scuba diving and viewing coral through glass-bottomed boats have become popular.

The increase in production and development has brought several problems in its wake. Environmental stress is now a cause for serious concern. Destructive and uncontrolled fishing, over harvesting, coral mining, pollution, unplanned coastal development, indiscriminate cutting

of mangroves to create shrimp hatcheries and sedimentation due to destructive land use practices, are the major causes of environmental degradation. Reefs that are threatened are mostly located close to human population centres (De Silva, 1985; De Silva and Rajasuriya, 1988; Rajasuriya, 1991, 1993; Ohman etal, 1993). This is of particular concern in Sri Lanka as almost all critical habitats are located near the shore and are easily accessible.

The pattern of destruction of critical habitats is seen in many other countries as well, particularly in South Asia and Southeast Asia (Wells, 1993). This situation has arisen primarily due to unplanned development resulting from a lack of understanding of the environment. It is comparatively recently that many countries have come to realise that the sea is not an unlimited source of fish and other products. Impacts vary according to the resource uses at a location or a country. Unlike natural impacts such as storms and hurricanes, the impact of human activities tends to be chronic and rarely allows a habitat to recover. The main causes of reef damage in a regional context are sedimentation, pollution that causes nutrient enrichment and over exploitation (Wells, 1993).

Many coastal nations have been alarmed at the rapid decline of their resources, especially coral reefs, mangroves and seagrass beds (Wells and Hanna, 1992; Wells, 1993; Bohnsack, 1993). A number of countries have attempted to arrest this situation by developing fishery sector management plans and by declaring protected areas. However, labelling a site as a protected area has not produced the desired results. Therefore a simultaneous development in the ASEAN region was to involve the community in the protection and management of critical habitats.

2. **ROLE OF** SANCTUARIES IN RESOURCE CONSERVATION

Marine Protected Areas (MPAs) play an important role in conserving fishery resources in coastal waters. Their main function is to provide a refuge where healthy breeding stocks of fish and other organisms can be maintained. The value of protected areas has been proved especially in some of the functional MPAs in the Southeast Asian countries where MPAs have been in existence of a number of years (Wells, 1993; White, 1986, 1988). The importance of a marine sanctuary in increasing fish catches was clearly demonstrated in the case of Sumilon Island Marine Sanctuary in the Philippines. Fish catches in this sanctuary increased considerably after 10 years of effective management, but declined rapidly when the island management broke down in 1984 (White, 1988). Most MPAs constitute coral reefs, mangroves and seagrass beds.

In Sri Lanka the need for protected areas has been recognised only recently. In 1982, a committee on marine parks and sanctuaries established under NARA recommended the creation of the Hikkaduwa Marine Sanctuary in the southwest and the Bar Reef Marine Sanctuary in the northwest. They have been declared through the Fauna and Flora Protection Ordinance of the Department of Wild Life Conservation in 1979 and 1992 respectively. Both sanctuaries were created primarily to safeguard the coral reefs from destructive human activities.

3. FISHERIES MANAGEMENT IN RESOURCES CONSERVATION

Direct impacts on selective organisms have been fairly well documented but information on a few organisms is inadequate in formulating coastal management plans. Unlike gathering

infonnation on most pelagic fisheries, where the study is concerned only with one or two species, often the inshore fisheries are not limited to a few species as most gear used are non selective and catches are multispecies.

Today intensive fishing has changed species composition and abundance, it also reduces the average fish size and age structure (Bohnsack, 1992). Population decline of species have been recorded from many areas. In the Caribbean fishing has affected the population of the Nassau Grouper *(Epinephelus striatus)* and the Jew Fish *(Epinephelus itajara),* this has led to the protection of these species in some locations. Giant clam populations in the Indo-Pacific region have been severely affected and in some parts they are listed as threatened. Barker and Shakeel (1991) expressed concern regarding the Giant Clam population in the Maldives. The Beche Der Mer fishery in the Maldives is also in need of management although only a few years old (Joseph and Shakeel, 1991). In Sri Lanka, destructive fishing methods and over harvesting and habitat destruction are major problems (Ormand, *1985;* Sadacharan 1991; Olsen *et al,* 1992; Rajasuriya, 1993; Ohman *etal,* 1993).

In many developing countries habitat destruction and wastage due to fishing is of great concern. In Sri Lanka, fish caught in bottom-set nets used to trap lobsters are discarded, eggs of lobsters are removed and thrown away. Blast fishing is rampant in the southern coastal areas as well as coral mining. Ornamental fish collection using destructive methods are also damaging the habitats. In the Philippines blast fishing, Muro-Ami fishing and the use of poisons is killing reefs (Wells and Hanna, 1992). In the Maldives the meat and the shells of the Giant Clams are discarded after removing the adductor muscle (Barket and Shakeel, 1991). Often trawlers haul in large amounts of unwanted species that are discarded.

Many Governments have now accepted that unmanaged resource utilisation has led to the degradation ofthe critical habitats that are so important for the well being of the community. Most countries have attempted to control harvesting by introducing regulations and the declaration of protected areas. However, these attempts have not produced the desired results mainly due to the lack of key components to effectively manage their resources. De Silva *(1985),* identifies the lack of sufficient funds, expertise, proper understanding of policy makers, awareness among users as well as politicians, as some of the main causes of the inability to implement regulations.

4. COMMUNITY INVOLVEMENT IN MANAGEMENT

Several governments have now realised that although it is relatively easy to declare a protected zone and to introduce legislation to control harvesting, it is extremely difficult to implement these regulations. In fact most areas in developing countries, designated as marine protected areas are in practice 'paper parks' with no effective management (Wells, 1993). A major reason for the inability to implement legislation is the lack of communication between the users of the area and the enforcement bodies. Often laws are introduced without consulting the local fishermen. Similarly, marine protected areas are declared by governments without the involvement of the community that will be affected. This creates suspicion among the locals and they view the enforcement authorities as insensitive to their needs. Therefore the community should be involved at the very beginning, at the planning stages. The involvement of the community at the very

beginning may mean the difference between success and failure. Many developing countries are now beginning to adopt community participation in resource management. Government agencies in countries such as Australia and the United States are effectively managing their resources in protected areas. It is noteworthy that in both countries incorporation of the community and stakeholders into management and conservation has been central to efficient management (White *et al,* **1994).**

4.1 Protected areas and community participation

In the Indian Ocean and Indo-Pacific regions Southeast Asian countries have been leading in establishing marine protectedareas with a community based management approach. This has been achieved through the ASEAN-US Coastal Resources Management Project (CRMP). This approach has been identified as the only way of ensuring proper management within a protected area. Local participation has been identified as a key component in the ultimate success of a properly functioning marine sanctuary (White, 1988). Traditionally protected areas were meant to keep out people who utilise the resources within its boundaries. On land this could be achieved to some extent by controlling access, but is extremely difficult to control in the sea due to lack of physical boundaries and the inability to patrol the area.

In Sri Lanka, selection of sites and the declaration of marine protected areas have been carried out by the government without consulting or involving local communities. As a result the local communities have become antagonistic towards the government departments or agencies attempting to impose regulations on fishing and other activities within a protected area (Wickremaratne and White, 1992), especially where such activities are harmful to the environment and have to be controlled or stopped. Further, due to the lack of understanding the community does not perceive the benefits of sustainable resource use practices. An intensive educational programme at the very beginning helps to orient the community towards understanding the value of the resources and the need to manage them for sustainability. An example from the Philippines is the Sumilon Island Marine Sanctuary where an extensive educational programme at the inception has been the main reason for its success (White 1991). However, educating the community is not a simple task. This process should involve the government at the local level as well as the community and the stakeholders.

5. COASTAL RESOURCE MANAGEMENT IN SRI LANKA

Coastal resource management in Sri Lanka is a recent development. Several government departments and ministries, particularly the Departments of Wild Life Conservation and Coast Conservation are responsible for the protection of natural resources in the coastal areas. The primary responsibility for coastal resources management lies with:

The Ministry of Fisheries and Aquatic Resources
The Department of Coast Conservation
The Department of Wild Life Conservation
The National Aquatic Resources Agency
The Central Environmental Authority

The Coastal Zone Management Plan of the Coast Conservation Department (CCD, 1990) addresses the key issues within the coastal zone and provides a framework for management. However, desired results have not been achieved although the initiatives have been based on rational and well thought out policies (Wickremaratne and White, 1992). They have identified the inability to mobilise the support and commitment of the local communities as the main reason for the failure.

5.1 Community-based management of a marine sanctuary in Sri Lanka

The Hikkaduwa Marine Sanctuary in the southwest of Sri Lanka was declared in 1979, through the Fauna and Flora Protection Ordinance of the Department of Wild Life Conservation. It is the first of only two marine sanctuaries in Sri Lanka. This area was declared a sanctuary primarily to save its coral reefs from human impacts. Attempts to protect this reef in the past have ended up in failure due to lack of local cooperation. Meanwhile activities that are harmful to the coral reef within the sanctuary continued to increase. These were illegal ornamental fish collection, discharge of effluent from hotels, illegal construction, damage due to fishing boats anchoring within the coral reef and other tourist related activities.

A community participatory process called the Special Area Management Project (SAMP) has been initiated at Hikkaduwa with support from the United States Agency for International Development (USAID). This process hopes to achieve resource management within the sanctuary area with the assistance ofthe community. Education and participation of the community is central to this process. It is implemented by the Coastal Resources Management Project supported by the Coast Conservation Departrnent. However it is a long way to successful management. SAMP is a time consuming and stressful process. The sensitivity and the ability to adapt to emerging concerns of affected individuals will determine the success of this project (Wickremaratne and White, 1992). The government agencies in Sri Lanka are now beginning to accept that involving the community or the ultimate beneficiaries in protecting and managing natural resources is the best way of ensuring sustainability.

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