

of the tank and also the areas along the roadside. The tank is heavily silted but supports irrigation and fisheries.

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Management of Marine and Coastal Resources in Sri Lanka

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Introduction

Under the jurisdictional arrangements of the United Nations Convention on the Law of the Sea (UNCLOS) Sri Lanka has gained rights over an Exclusive Economic Zone covering an area extending to 200 nautical miles beyond her shoreline. As a result the marine territory for which Sri Lanka has national jurisdiction is more than seven times her land area, covering some 447,140 sq. km.

As an island nation Sri Lanka has been dependent on a variety of its coastal and nearshore marine resources throughout its history. Coastal communities have practiced traditional fishing methods and artisanal fisheries since time immemorial. Likewise, the many highly productive lagoons and estuaries that dot the coastline of the country support their own fisheries. While the fisheries sector has shown steady growth over the years, the marine fisheries provide much of the protein needed not only for coastal communities but also for many of the hinterland communities within the island. In addition to this, mangroves wherever they occur around the island have been a traditional source of material for timber, crafts, food and medicine. Being located in the tropics, Sri Lanka also has both coral and sandstone reefs that fringe its coastline and have high biological diversity within them.

Resource Exploitation and Conservation Issues

Traditional fisheries in Sri Lanka were carried out using non-mechanised craft such as dugout canoes, canoes with sails and wooden rafts. The fishing gear used before the mid 1950's included hook and line, traps, gillnets and beach seines. In the 1950's the mechanisation of the fisheries began with the introduction of mechanised craft and nylon nets. Although the fisheries sector has shown steady growth since then exploration and exploitation of the fishery resource potential of the vast marine area belonging to Sri Lanka has thus far been limited.

Meanwhile, increased concentration of fisheries activity within nearshore coastal waters has expanded rapidly to the extent that the resource potential of this zone may soon be over-used to the detriment of the resource itself. It has also caused resource exploitation conflicts between traditional or artisanal fishermen and the more modernised industrial fishing craft operators especially within coastal waters. The dearth of research related to stock assessment of commercially important species and the effects of increased exploitation on these stocks has resulted in a lack of definitive information which would be crucial for the management of this important resource in time to come.

Meanwhile in a bid to develop aquaculture in the 1980's, a sudden proliferation of coastal shrimp farms took place along the north-western seaboard. This rapid expansion of shrimp farms paid little respect to environmental concerns such as destruction of mangroves, which in turn led to a multiplicity of other environmental problems such as flooding along this coastline. In this respect economic expediency took precedence over environmental sustainability and in time led to economic catastrophe in the form of viral diseases that affected the prawn farms themselves, casting a doubt on their further economic viability.

The highly sensitive and biologically rich coral reefs too are continuously exploited as a source of lime for use in the construction industry. Although extraction of coral has been declared an offence many years ago, violation of the law continues unabated. In addition to this, destructive fishing practices such as the use of dynamite, anchoring of boats on reefs and unregulated tourism cause additional damage to these reefs. Inland land-use practices such as agriculture and tourism development along the coast also result in increased sedimentation and pollution leading to the destruction and degradation of reef areas.

Mangrove areas are also subjected to uncontrolled exploitation. While local communities exploit mangrove resources at a subsistence level, in recent times entire mangrove areas have been cleared for aquaculture and



Figure 1. Mechanised commercial fishing fleet at Negombo.



Figure 2. Land degradation in the coastal belt due to unauthorized mining of fossil shell deposits at Kalametiya

land reclamation activities. The extent of mangroves along the coastline of the island is thus dwindling rapidly and leading to other environmental issues. The importance of mangroves in protecting coastlines from erosion and serving as nursery grounds for many species of marine organisms including species of fish and crustaceans that are important to fisheries has been largely ignored.

All brackish water environments, including lagoons, estuaries and associated habitats such as the few remaining mangroves and seagrass beds that are dynamic and highly productive ecosystems are becoming increasingly polluted through land-based sources. Industrial and domestic effluent, solid waste and oil from fishing craft contaminate these ecosystems. Unregulated inland land-use practices that cause increased soil erosion also have highly detrimental effects on the coastal ecosystems through increased siltation and turbidity. Uncontrolled use of agro-chemicals for inland agriculture is another form of pollution, which is a cause for concern in coastal waters. The importance of these ecosystems not only as breeding and nursery grounds for commercially important species of fish and crustaceans but also as important habitats for endangered wildlife such as marine turtles, the highly endangered dugong and aquatic birds both resident and migratory has been overlooked.

As a developing country, the fisheries sector as well as many other sectors that affect marine and coastal habitats in Sri Lanka have been developing rapidly in the last three decades. Unfortunately no corresponding conservation activities to protect the resources in these marine and coastal habitats have taken place. This becomes quite evident when one looks at our extensive protected area network within which there are only two marine protected areas and one Ramsar site declared to-date, while terrestrial protected areas are numerous throughout the island. Even these two marine protected areas have been declared only with the aim of protecting two specific coral reef areas at Hikkaduwa and the Bar Reef. Unfortunately, the concept that all coastal and

marine habitats are interconnected and that the ocean is an open system where everything is connected to everything else is yet to be understood in the management of our marine and coastal resources.

The Role of Integrated Coastal Management

Failure to conserve important marine and coastal habitats and their denizens has been exacerbated by the highly sectoral policies of the responsible institutions. These institutions may also have a lack of personnel with the know-how and training to deal effectively with coastal and marine environmental issues. However the first attempt at dealing with the protection of the coastal environment was made with the declaration of the Coast Conservation Act in 1981 and the formation of the Coast Conservation Department (CCD). According to this act the Coastal Zone of Sri Lanka is "the area lying within 300 meters of the mean high water line and a limit of two kilometers seaward of the mean low water line". This legislative enactment was intended mainly to address the problems of coastal erosion exacerbated by development activities within the coastal zone. The CCD subsequently prepared an initial Coastal Zone Management Plan in 1990 through a consultative process and this was further improved by a Revised Coastal Zone Management Plan in 1996. While the coastal zone is under the jurisdiction of the CCD marine protected areas are administered by the Department of Wildlife Conservation (DWLC) and mangrove areas by the Forest Department (FD). As a result, in activities related to conservation the sectoral approach still predominates with institutions acting in isolation under their specific mandates while overlapping jurisdiction creates its own administrative problems.

In essence, the sectors dealing with resource exploitation (coastal fisheries, aquaculture, land reclamation) have developed independently while sectors dealing with environmental protection (CCD, DWLC, FD) have also developed independently. There is little or no coordination or co-operation between practitioners and/or managers in each sector. In this

scenario it is evident that conventional sectoral management is not effective in dealing with the complex multi-sectoral coastal environmental issues that arise in a developing country. As a result there is an urgent need for Integrated Coastal Management (ICM) interventions with a broad cross-sectoral approach that is adequate to deal with these complex issues. However ICM initiatives introduced in developing countries like Sri Lanka at present merely pay lip service to the concept. There are several accepted definitions for integrated coastal management such as:

- "The term integrated coastal management (ICM) is used to describe a continuous and dynamic process that unites government and community, science and management, sectoral and public interests in preparing and implementing an integrated plan for the protection and development of coastal systems and resources." (GESAMP, 1996)
- "Integrated coastal zone management is a dynamic process in which a coordinated strategy is developed and implemented for the allocation of environmental, socio-cultural and institutional resources to achieve the conservation and sustainable use of the coastal zone." (ESCAP, 1995)
- "Integrated marine and coastal area management is a participatory process for decision making to prevent, control, or mitigate adverse impacts from human activities in the marine and coastal environment and to contribute to the restoration of degraded coastal areas. It involves all stakeholders including: decision makers in the public and private sectors; resource owners, managers and users; non-governmental organisations; and the general public." (SBSTTA/IUCN, 1996)

However this ICM concept has been designed and adopted according to a largely westernised or developed country mindset. The socio-political situations prevalent in most developing countries like Sri Lanka are therefore hardly conducive to the practice of such a concept. If ICM interventions are to be useful in Sri Lanka both the concept and the methodology should be adapted to suit the local situation. An essential ingredient for the success of an ICM initiative is stakeholder participation at both the planning and implementation stages. This means that coastal communities who will be affected beneficially or adversely by such initiatives must become effective participants and their needs and aspirations must necessarily be built into the ICM programme.

Sri Lanka like many developing countries cannot meet the costs of ICM initiatives by itself and is therefore forced to initiate such activities with the assistance of donor funding. For this reason ICM interventions are often tailor-made to suite donor priorities and in so doing the priorities of the communities these projects are meant to assist are lost along the way. As a result the ICM interventions become unsustainable in the long-term,

because local support and community participation that are necessary for success are lacking after the initial stages. Inevitably the management interventions thus introduced will not last beyond the lifetime of the donor-funded project. Neither environmental integrity nor sustainable resource exploitation nor community upliftment will be achieved in any meaningful or long lasting manner.

Conclusion

It is therefore imperative that we should make use of lessons learned and make our ICM initiatives more practical and result oriented if they are to achieve the ultimate goal of sustainable management of coastal and marine resources. Only through well-planned and carefully implemented ICM interventions with full stakeholder participation can the aspirations of our coastal communities be met without jeopardizing ecological integrity and environmental quality in fragile coastal habitats. In doing this it is essential to take into consideration the unique qualities of both socio-cultural and environmental factors inherent in each individual scenario.

The present practice of blindly adopting ICM as practiced in developed countries and expecting it to be a cure-all by performing miracles in Sri Lanka is both unrealistic and a waste of precious financial resources. The ICM concept should be adapted in an innovative manner to suit unique local situations if positive results are to be expected. Such effective adaptations can help us achieve the end result of long-term coastal resource management, maintenance of sustainable habitat quality and an adequately developed living environment for coastal communities through successful ICM programmes.

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