

Mangroves: Protection from Storms and Sea-level Rise

 Tiago Cardoso de Miranda
 U.S.-Brazil Consortium in Marine Policy
 Rio de Janeiro State University/University of Delaware

Mangroves are tropical wetland ecosystems previously regarded as useless lands. Mangroves were targeted for extensive clearing and conversion for development of the coastal zone. Mangroves are important to fisheries, the wood industry, wildlife conservation, carbon sequestration, and protection of the shoreline, among others. Their elaborate root structure is the basis for its stabilizing function of the coastline. Sediments trapped in their elaborate root system is the starting point in colonizing new areas. The sturdy root structure provides a buffer against storms and erosion.

The tsunami that hit Asia in December 2004 emphasized the need for shore protection. The disaster also stressed the potential impacts of clearing wetland vegetation, including mangroves, cited as among the main problems that contributed to the magnitude of the disaster. Overpopulation in the coastal area and a proliferation of tourist resorts along with aquaculture and agriculture activities seem to be the major issues involved.

The impacts of sea-level rise is similar to the Tsunami but with a difference in time scale. Concern about sea-level stems from projections in flooding of coastal areas. Increasing average temperatures appears to be an important factor in the increase in storm occurrence. Mangroves have varying patterns of response to temperature and other climate changes. They are expected to keep pace with the sea level rise, but in some places they are suffering from erosion and seem to be migrating to colonize other areas. The understanding of the parameters controlling mangrove behavior and distribution is of prime relevance to the management and rehabilitation of mangroves, especially in regard to implementation of coastal plans of action dealing with the sea-level rise and the incidence of dangerous storms that threaten people living in the coastal zone.

The RAMSAR Convention and the World Heritage Convention address the importance of mangroves in achieving sustainable development. The post-tsunami task force created by UNEP has developed guidelines for shore protection including construction of greenbelts and enhancing the ability of the natural system to act as a bioshield. Management of mangrove areas is considered to be an appropriate response to threats from storms and coastal erosion. Future actions addressing the conservation of mangroves for various ecological and economic purposes should incorporate processes that are already in place into appropriate implementing structures that follow co-management approaches that involve local communities, governments and the scientific community. Reforestation programs are desirable in some cases, but should be undertaken with proper environmental assessment. Socio-economic considerations include relocation of economic activities and villages and the maintenance of local communities' use of resources. In most cases, the increasing value of protection of the coast with the recent trend of climate change and reasonable costs associated with mangrove afforestation and reforestation indicate economic feasibility of these initiatives for coastal countries.