

Mangrove management at the Gulf of Kutchch, India for coastal protection and resilience to climate change

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Abstract

Over the past 50 years, approximately one-third of the world's mangrove forests have been lost, but most data show very variable loss rates and there is considerable margin of error in most estimates. Mangroves are a valuable ecological and economic resource, being important nursery grounds and breeding sites; a renewable source of wood; accumulation sites for sediment, contaminants, carbon and nutrients; and offer protection against coastal erosion. The destruction of mangroves is usually positively related to human population density. Major reasons for destruction are urban development, aquaculture, mining and overexploitation for timber, fish, crustaceans and shellfish. Over the next 25 years, unrestricted clear felling, aquaculture, and overexploitation of fisheries will be the greatest threats, with lesser problems being alteration of hydrology, pollution. In addition to that mangroves are even more endangered to future sea-level rise caused by global warming. The Gujarat Forestry Development Project aims at an integrated management of natural resources that include an appropriate mix of forest and non-forest lands and biodiversity objectives. In Gujarat, a state with inadequate forest cover and quality, the urgency to continue to strengthen these efforts is obvious. Focus area is the Gulf of Kutchch. Its northern coast has tidal flats while the southern coast is characterized by coral reefs, islands and extensive mudflats large areas, which are part of the Marine National Park and Sanctuary. There are still some patchy natural mangroves areas, which are not well protected showing signs of depletion and degradation.

Realizing the importance of mangrove forests, the state government undertook plantation of mangroves since 1969. The main objective is the increase of coastal protection. Actually with financial support of JICA and giz^{IS} in the framework of the Gujarat Forestry Development Project 15,000 ha of mangroves are planned to plant in this area, using mainly *Avicennia marina*. Planting is successfully performed with the application of the *Otla* technique, which are raised platforms of mud of 1 x 1 m in the inter-tidal zone, with about 80 seedling/m². As no subsequent thinning is done and replantation is mainly practiced as monoculture, the intended function of mangroves for coastal protection is endangered. The consequences of this inadequate management for mangrove rehabilitation will be discussed, as these areas are highly vulnerable to climate change impacts. On the other, healthy coastal wetland ecosystems, such as mangrove forests, can reduce that vulnerability as they provide protection from climate impacts like storms or sea level rise.

Keywords

rehabilitation, *Avicennia marina*, green belt, ota technique, mangrove loss