

Socio-economic Significance of Mangroves in India

A. G. UNTAWALE and S. WAFAR
National Institute of Oceanography, Dona Paula-403004, Goa, India.

ABSTRACT

Mangrove ecosystem is considered ecologically and economically important perhaps due to its high productivity. However, due to the lack of proper scientific knowledge as well as the rapid increase in various developmental pressures along the coastal region of India, mangrove resources have been over exploited. This has led to tremendous degradation of not only mangrove forests but also several mangrove dependent systems.

It would be worthwhile to peep into various socio-economic and also ecological gains from mangroves in India as well as the pressures developed as a result of human interference.

Key Words: Socio-economics, Mangroves, India.

INTRODUCTION

Mangroves play a significant role in the socio-economic life of coastal population. These are among the highly productive, tropical coastal ecosystem, where most of the primary production is derived from both aquatic and terrestrial sources (Wafar, 1989). Mangroves are both economically and ecologically important. Mangroves with their network of root system, play a significant role in shoreline protection and land stabilization. Because of the high productivity rate, they make themselves ideal sites for fish and prawn nursery and breeding centres (Heald, 1971; Odum and Heald, 1975).

Recently, due to the mounting pressures on the coastal land and conflicts in its use, the concerned authorities have started evaluating the importance of such sensitive, fragile and so far totally neglected regions, on the basis of socio-economic factors. An attempt has been made in the present paper to highlight some of these aspects of mangrove ecosystem along the Indian coast.

Indian mangroves are being used for various purposes like timber, boat building, tannin extraction, fuel, stakes for fishing, fodder and fertilizer. There are a few areas where bark and roots of *Derris heterophylla* are used as fish poison. *Avi-*

cennia spp, *Phoenix* spp and *Sonneratia caseolaris* are used for cattle feed and human consumption. *Acrostichum arum* leaves are used as green vegetable. Leaves of *Acanthus ilicifolius* are used for rheumatic disorders, leaves of *Bruguiera* spp for blood pressure and latex, leaves and bark of *Excoecaria* spp for several ailments.

Role of mangrove swamps in brackish water fish culture is very significant and has received considerable attention (Heald, 1971; Odum and Heald, 1975). The common species cultivated are *Penaeid* spp, *Macrobrachium* spp, *Chanos-chanos* *Mugil* spp. Mangrove associated fishery is directly dependent on distribution of mangroves and their survival.

There are a few areas where human habitation depends mostly on the mangrove forest for example Sunderbans and Andamans. At Sunderbans region, wood of *Heritiera fomes* is usually used for boat-building. *Bruguiera gymnorhiza* from Andamans is used for transmission and telegraph poles. In Gulf of Kachchh, mangrove vegetation is the only source of fuel and fodder for cattle, camels and goats during the days of famine.

Supralittoral zones along the estuaries where saline water reaches once or twice a month is generally used for salt production. Gulf of Kachchh,

Maharashtra, Goa, Kerala, Tamil Nadu and Sunderbans have vast areas for salt production.

Indian mangroves are severally affected as a result of over exploitation for various purposes. Mangrove trees have been the source of firewood in coastal India and perhaps this is one of the major kind of exploitations, which has degraded the mangroves to the present extent. For example, in Gulf of Kachchh, mangroves are over-exploited because of arid climate and non-availability of any other source of vegetation for fuel, fodder and timber. The Waghar community largely depends on mangroves for different reasons. It was estimated that about 300 tonnes/year of firewood and about 140 tonnes/year of fodder were gathered from this area (Kulkarni, 1950). Untawale and Parulekar (1978) on the basis of personal enquiry, estimated that about 110,000 tonnes of mangrove trees were cut in Pirotan Island from 1948 to 1978. During the famine year 1988-89, according to the official sources 50,000 licences were issued to the local people of Kachchh for harvesting mangroves for fuel, fodder and also the *Avicennia* seeds for human consumption. The young children and women-folk usually are seen collecting the firewood from far-off places. Most of the mangroves in Bombay and Cochin are deforested for industrialization, construction and reclamation purposes. The mangroves from Sunderbans, however, were over-exploited for paddy cultivation. Cochin backwater is one of the glaring examples of human interference where the construction of Thanirmukam dam has destroyed the backwater system, leading to the proliferation of the freshwater fern *Salvinia* sp., and also completely destroying the mangrove, dependent prawn and other fisheries. These activities which are still continuing, affected the mangrove forests of India considerably, creating the erosion problem and adversely affecting the coastal productivity.

CONSERVATION AND MANAGEMENT

The present status of Indian mangroves suggests that it is essential to develop a well planned programme for the proper management. Necessary goals for the proper management are to prevent further destruction, to provide for basic human needs with a required protection to the mangrove ecosystem. The major aspects are: conservation, utilization and management options which also include: legislation for water and land use, regularization of

deforestation, restriction on reclamation, declaration of mangroves as parks and reserves, reforestation of denuded areas and afforestation of open suitable areas. Creating an awareness on importance of mangroves among the local habitants is an essential aspect of management.

PRESERVATION

Mangroves can either be preserved or closed to the exploitation of any kind. The total area under some degree of preservation represents less than 1% of total world mangroves (Hamilton and Snedaker, 1984). Some of the mangrove vegetation with more risk of degradation can be preserved completely from exploitation. Gangetic Sunderbans as a result of Tiger project were the first mangroves to be declared as "protected" and the total area that falls under this project is 20,000 ha. The mangrove forests of southern bank of Gulf of Kachchh are protected and declared as mangrove park (Chavan, 1985). In Goa, the mangroves of Chorao Island are declared as "Reserve" and are being developed into recreation and education centre or tourists and students for bird watching, wild life studies and nature education. Similarly, some of the Andaman and Nicobar Islands are declared as "Biosphere Reserve" and are being considered for crocodile and turtle farming. The rare and endangered species will be grown and preserved in some reserve areas like Andaman and Nicobar Islands for future natural gene banks. Various aspects of future plan of mangrove area planning are shown in figure 1.

RESTORATION OF OPEN AREAS :

Keeping in view the ecological and socio-economical significance of mangrove ecosystems, it is not only necessary to conserve them but also to restore the barren intertidal areas by undertaking large-scale afforestation to bring back the coastal productivity to normal. For the first time, mangrove afforestation on experimental basis was tried by Qureshi (1959), Kulkarni (1959) and Mathauda (1959). (Mangrove afforestation and nursery development at Goa was tried by Forest Department, covering about 115 ha. of area) (Untawale, 1987). Social Forestry Department along the Maharashtra coast has established five mangrove nurseries, restoring about 125 ha. of area (Raddi, personal communication). Along the coastal Karnataka, the Forest Department has also taken up the afforestation of open areas with *Rhizophora mucronata*.

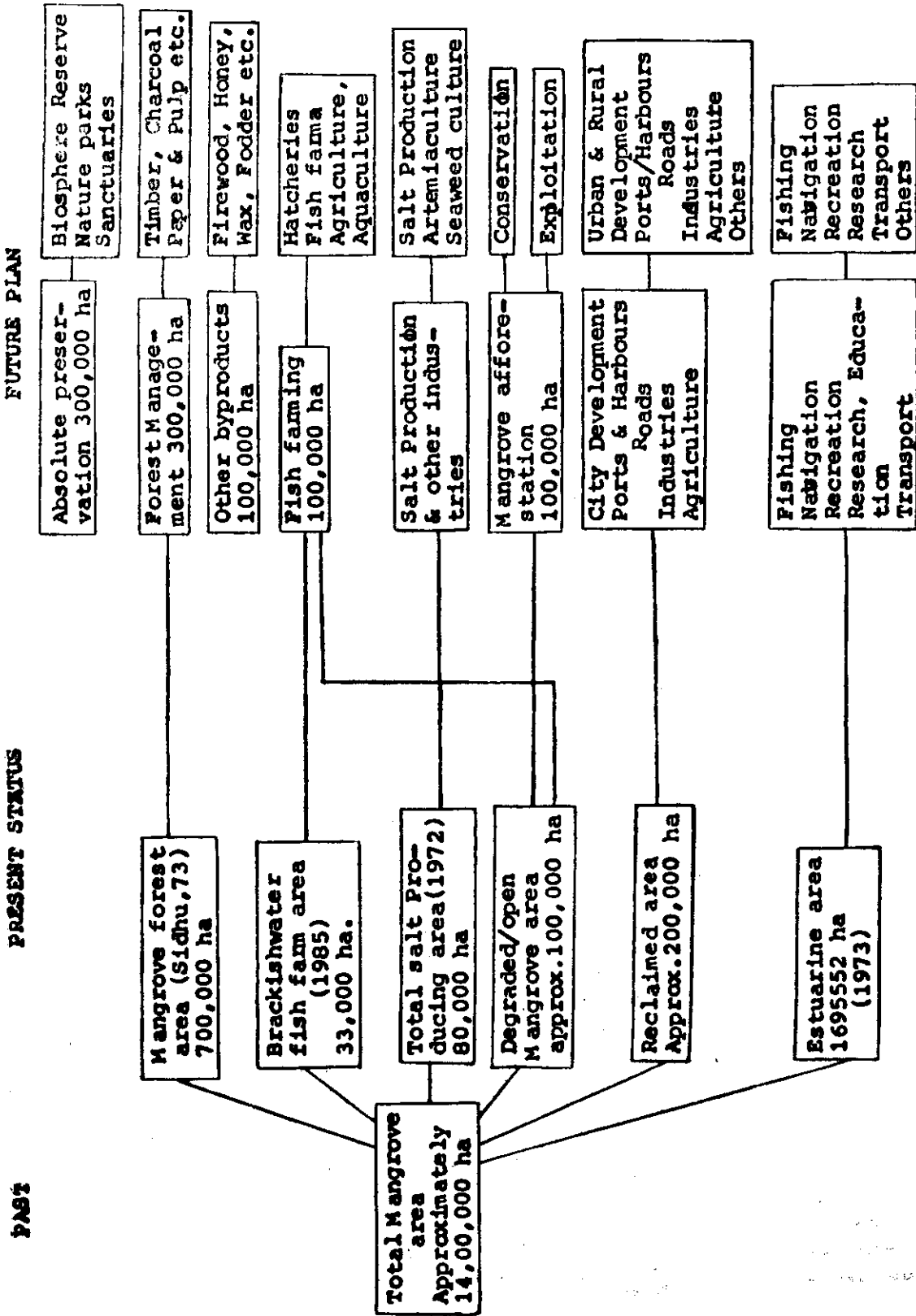


Fig. 1 — SOCIO-ECONOMIC SIGNIFICANCE OF MANGROVES

SIGNIFICANCE OF RECREATION

Mangrove forests are natural intertidal forest with immense biological diversity and great ecological significance. The mangrove flora is represented by 111 genera and 160 species, while the faunal components of mangrove ecosystem are 199 genera and 458 species.

The mangrove ecosystem comprises the biota, the estuarine water body and the soil which is rich in detritus. Therefore, these areas function as the natural breeding centres or nurseries for several marine organisms.

Due to the rich biota, scenic beauty and the uniqueness of the environmental characters, certain areas along the Indian coast and the major islands can be used for recreation and tourism. In India such areas have not been fully exposed to the tourists, due to the lack of sufficient information, fear of destruction and misuse of the ecosystem. It is, therefore, essential to approach the problem on a scientific basis.

There are areas already identified for tiger reserves, bird sanctuaries, crocodile parks and several other plants and animals which can attract tourists.

REFERENCES

- CHAVAN, S. A., 1985. Status of Mangrove Ecosystem in Gulf of Kutch. In : *Symposium on endangered marine animals and marine parks*, Vol. 3 : Marine Parks, Sanctuaries and Reserves. Marine Biological Association of India, Cochin, India.
- HAMILTON, L. S. and SNEDAKER, S. C., 1984. *Handbook for Mangrove Area Management*. IUCN — UNESCO and UNEP Publications, :123.
- HEALD, E. J., 1971. The production of organic detritus in a south Florida estuary. *Sea Grant Tech. Bull.*, 6:110.
- KULKARNI, D. H., 1959. Extension of mangrove species into the coastal saline blanks. In : *Proceedings of Mangrove Symposium*, Calcutta:33-35.
- MATHAUDA, G. S., 1959. The mangrove forests of India. In : *Proceedings of Mangrove Symposium Calcutta*: 66-87.
- ODUM, E. P. and HEALD, E. J., 1975. The detritus based

COASTAL LAND USE PLAN

Recently efforts have been initiated to prepare the land use plan under the coastal zone management. Mangroves, which form one of the most important component of the coastal zone, can be classified into mangrove and non-mangrove areas. The luxuriant mangrove areas can be considered for preservation or conservation with management practices. The suitable areas from non-mangrove portion can be restored or afforested for further ecological and economic gains. The highly degraded or unsuitable areas may be released for other developmental activities like fish farms, non-polluting industries, agriculture, salt production etc. A model coastal land use plan is shown in Fig. 1.

It is now established on the basis of ecological data that there is a tremendous potential in the mangrove ecosystem, if used very carefully and judiciously without disturbing the balance of the nature.

ACKNOWLEDGEMENT

Authors would like to record their sincere thanks to the Director, National Institute of Oceanography, Dona Paula, Goa for the facilities.

food web of an estuarine mangrove community. In : *Estuarine Research* (ed. Wiley M.), Academic Press, Vol. 1 : 265-286.

QURESHI, I. M., 1959. Botanical silvicultural features of mangrove forests of Bombay State. *Proc. of Mangrove Symposium*, Calcutta: 20-26.

UNTAWALE, A. G., 1987. Some observations on mangrove afforestation along central west coast of India. *Proceedings of the International Symposium on Afforestation of Salt affected soils*. Vol. 2 :133-150.

UNTAWALE, A. G. and PARULEKAR, A. H., 1978. Status report of Pirotan Island (Gulf of Kuchchh) for starting a conservation plan. Sponsored by WWF, Bombay:1-16.

WAFAR, S., 1989. *Ecology of Mangroves along the Estuaries of Goa*, Ph.D. Thesis. University of Karnataka, (Unpublished).