

# LAKSHADWEEP TIMES

DAILY

ലക്ഷദ്വീപ് ടൈംസ് ദിനപ്പത്രം

Vol. \* XIII. No. 189.\* KAVARATTI \*SUNDAY\* 11 APRIL, 1999. Price Rs. 2.

# MANGROVES AND THEIR ROLE IN ISLAND ECOSYSTEMS

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Until recently, mangrove swamps were seen as mosquito-infested wastelands, utilized as convenient sites for open dumps and sewage discharges. Mangrove forests are, however, among the most productive ecosystems of the world. Their productivity is about 70 times the maximum value reported for tropical oceanic waters. Because of this high rate of organic production, they are able to sustain important and valuable populations of fish, shellfish and wildlife and are prime breeding and nursery grounds for many species. Mangroves act as a self-maintaining buffer zone against storms, strong winds and currents and reduce coastal and riverine erosion. The main reason the mangroves have been undervalued and poorly managed is the lack of available information about the resource, its role and vulnerability.

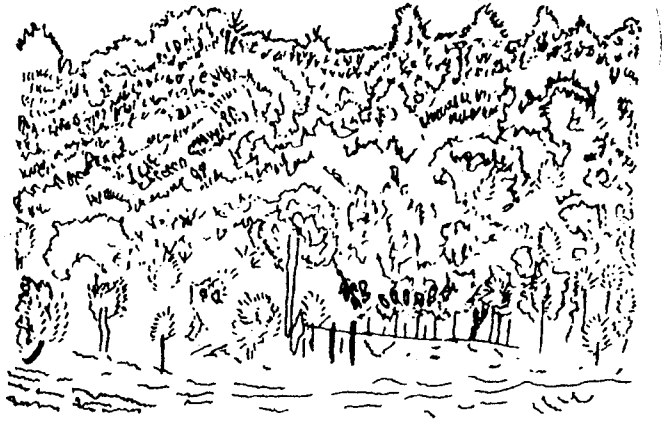
COASTAL EROSION



The word 'mangrove' is employed to describe a group of plants adapted to colonize water-logged, oxygen-poor, saline soils. They grow as trees or shrubs along most tropical estuaries and sheltered shores. The distribution of mangroves are limited globally by temperature and their lack of tolerance to cold conditions. Other limiting factors include suitable physiography, presence of salt water, tidal amplitude, precipitation, river discharge, shelter and availability of nutrient-rich sediments.

Mangroves are believed to have originated in the Indo-Pacific region with 60 species reported from this area. India has a mangrove cover of 3150 sq. km and 80% of it occurs along the east coast and in the Andaman Islands. The mangrove swamps of Sunderbans in West Bengal has the maximum mangrove cover in India. Other areas include the mangroves of Mahanadi delta, Kutch and Saurashtra, Pitchavaram and Muthupet in Tamil Nadu. In Lakshadweep, mangroves are noticed in Minicoy island comprising three species.

A MANGROVE PLOT AT MINICOY

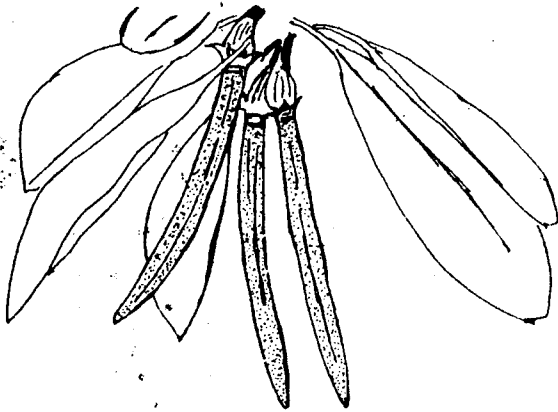


The mangroves of Minicoy has been described in an earlier communication by Nasser and Kunhikoya (**Lakshadweep Times**, Minicoy, 6 June 1996). Unlike the mangroves of the Indian mainland, these plants are in the formative stage and free from serious human pressure. They are present as two patches each of about 1 ha in area. The mangroves on the south-eastern side of the island comprise of a single species, *Bruguiera cylindrica*, while the mangroves of the south-western side near helipad consist of *Ceriops tagal* and a solitary tree of *Avicennia marina*.

Coral reefs, seagrasses and mangroves interact physically in a number of ways. Seagrasses and mangroves are highly dependent on barriers such as coral reefs which reduce wave energy. In turn, mangrove forests act as depositional basins and are effective binders of sediments. As a result the sediment load in coastal waters is reduced, shoreline erosion is prevented and flushing of beaches is checked. Mangrove forests also regulate fresh water inflows into coastal areas. Fresh water entered in mangroves are lost by evaporation or dissolved with the salts present in mangroves before entering coastal waters. Thus the volume of undiluted fresh water reaching the coast is reduced. Since the fresh water is discharged from mangroves over a longer time period, salinity changes are also buffered. Many marine plants and animals including corals are sensitive to salinity variations.

The inorganic nutrients, phosphorus and nitrogen are essential to the primary production of all ecosystems. In most marine systems, nitrogen is considered to be the most limiting nutrient, and this is probably true of coral reefs, seagrasses and mangroves. Mangrove and seagrass systems tend to "leak" or export nutrients. Some of the excess nutrients enter the coastal waters as dissolved and particulate organic matter and nourish reef organisms. Water flowing out of mangroves have high levels of dissolved organic matter. These materials are transported by water currents and acted upon by micro-organisms, zooplankton, ciliates and other organisms. They break the leaf and wood of mangroves into small fragments. A small particle with its associated microbial community constitute a protein rich food source for large marine animals.

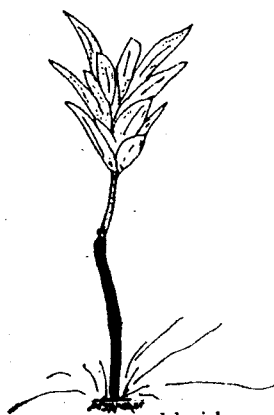
MANGROVE SEEDS



Coral reefs are known for the diversity and abundance of their fish and invertebrate fauna. Mangroves areas are recognised as important nursery areas for many important commercial organisms as well as some of the reef species. The nursery function of mangroves is mainly due to the availability of shelter for juvenile organisms and to an abundant supply of food. Many of the reef animals have their early life stages in the mangrove regions and later move away and migrate off shore. Examples of such behaviour include the spiny lobsters, shrimps and a variety of fishes. The larvae of lobsters have a free swimming existence and finally settle among the roots of mangroves. As the juveniles grow, the mangrove roots no longer provide sufficient shelter and they move off to deeper waters and reefs. The presence of juveniles attract large predatory fishes to the mangroves making them excellent fishing grounds for carnivorous fishes.

Human impacts disturb mangrove systems in varying degrees ranging from trivial effects to complete destruction. Direct, deliberate, physical disturbance to mangroves include cutting of trees and stripping bark for tanning. A common destructive practise is clear-cutting and filling to create dry land. Other factors that destroy mangroves include oil spills and thermal effluents. Garbage dumping and concentration of pesticides results in death of mangroves. Excessive fisheries in mangrove areas lead to depletion of stocks. Destruction of mangroves will result in sediment flows onto coral reefs causing permanent damage. There will be excessive outflow of particulate and dissolved organic matter which may cause smothering, shading and eutrophication. Finally, refuges and nursery grounds for various fishes and invertebrates will be destroyed and secondary productivity of seagrass beds and reefs will be reduced.

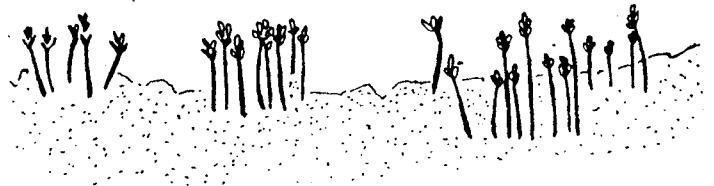
MANGROVE SEEDLING



Island coastal marine ecosystems worldwide are facing problems due to high populations, mounting pressure to develop, a limited land base, and inadequate impact assessment procedures.

In small islands like those of Lakshadweep, inland and coastal ecosystems are intimately linked. Inland activities like deforestation, agriculture, raising of domestic animals, road building and many other activities can increase sediment levels in coastal ecosystems are intimately linked. Inland activities like deforestation, agriculture, raising of domestic animals, road building and many other activities can increase sediment levels in coastal waters, contributing to the degradation of coastal ecosystem. Protection of the marine resource depends on developing land use practices that will not impair the productivity of mangroves, seagrass beds and coral reefs.

MANGROVE SEEDLING ON MARSHY SHORE



Society derives direct and indirect benefits from the conservation of mangroves. They are part of the resource base upon which islands depend. There are very practical reasons for their conservation, including the products they yield (wood, fisheries) and their role in protecting the coasts from erosion. Tourism, an important source of income, can be developed to take advantage of their uniqueness and great beauty. Natural reserves and parks can be established to protect important areas, these attract local as well as international tourists and also stimulate scientific research, all of which benefit the local economy. Mangroves are valuable educational assets.

Mangroves are among the most productive coastal ecosystems known to science. In addition to their aesthetic and recreational values, they form an important economic resource base of islands due to their intimate ties to fisheries, seagrass beds and coral reefs. The plea to conserve mangroves generally evoke negative reactions. This is because of a lack of understanding of their importance. There is an urgent need to provide education and increase awareness at various levels of society, on the ecological and economical importance of mangroves. An understanding of their role in coastal protection and the nature of fish and wildlife should lead to more enlightened mangrove management practices.

### ഒറ്റനോട്ടത്തിൽ

- \* ഇന്നലെ അന്തരിച്ച മലയാള സാഹിത്യ ആചാര്യൻ തകഴി ശിവശങ്കരപ്പിള്ളയുടെ മൃതദേഹം പൂർണ്ണ ഔദ്യോഗിക ബഹുമതികളോടെ തകഴിയിലെ വീട്ടുവളപ്പിൽ ഇന്ന് വൈകുന്നേരം സംസ്കരിക്കും.
- \* ബി.ജെ.പി. കൂടുതൽ പിന്തുണയ്ക്കുള്ള ശ്രമങ്ങൾ ശക്തമാക്കി.
- \* അവിശ്വാസ പ്രമേയം കൊണ്ടുവരില്ലെന്ന് കോൺഗ്രസ് പറയുന്നു.
- \* വിഷ്ണുഭാഗവത് പ്രശ്നത്തിൽ ധവളപത്രം പുറപ്പെടുവിക്കണമെന്ന ആവശ്യം കേന്ദ്രമന്ത്രി ജേർജ്ജ് ഹെർണാണ്ടസ് വീണ്ടും നിരാകരിച്ചു.
- \* ദക്ഷിണ റയിൽവെയിൽ ഇന്ന് റിസർവേഷൻ സൗകര്യം ലഭ്യമായിരിക്കുകയില്ലെന്ന് ഔദ്യോഗിക വാർത്താകുറിപ്പ് അറിയിച്ചു.
- \* കൊച്ചിയിൽ സമാപിച്ച നാലാമത് അന്താരാഷ്ട്ര ചലച്ചിത്രോത്സവത്തിൽ തയ്വൻ ചിത്രമായ "ഹർട്ട്വേഴ്സ് ഓഫ് ചാൻസായ" മികച്ച ചിത്രമായി.
- \* ഷാർജ്ജകപ്പ് ത്രിരാഷ്ട്ര ക്രിക്കറ്റിൽ ഇന്ത്യ ഇന്ന് ഇംഗ്ലണ്ടിനെ നേരിടുന്നു.
- \* കേന്ദ്രഗവൺമെന്റ് ജീവനക്കാർക്ക് 10 ശതമാനം ക്ഷമബത്ത അനുവദിച്ചു.