

# The Sundarbans and coastal fisheries

MD EMDADUL HAQUE

THE Sundarbans is considered to be the single tract largest mangrove forest in the world that covers an area of 6017 km<sup>2</sup>, out of which 4143 km<sup>2</sup> is the landmass. The remaining 1874 km<sup>2</sup> are water bodies in the form of numerous rivers, canals and creeks of widths varying from a few metres to several kilometres. Most are tidal in nature and are connected to the larger rivers and estuaries. Despite these, the Sundarbans is a potential tourist attraction, renowned for its beauty and unique ecosystem important for study and research. The Sundarbans also plays an important role as a buffer in protecting the agricultural hinterlands from the onslaught of frequently occurring cyclones and tidal surges. The Sundarban mangrove forest

**Fish depend on mangroves and estuaries as nurseries (food and shelter) and these habitats are important for juvenile and adult fish for their survival and growth...So the Sundarbans mangrove forest needs proper attention, management and political commitment for sustainable coastal fisheries development in the area.**

constitutes about 51 percent of total forest area and 4.2 percent of the total land area of the country. These mangrove resources play an important role in the national economy of Bangladesh and can be divided into forestry, fisheries and aesthetic components.

Mangrove forests are considered a source of primary productivity in the form of litter: reproductive products,

twigs and the whole dead tree which directly or indirectly contribute energy to the ecosystem. The mangroves improve soil salinity because they can prevent hypersaline conditions by removing salt from the soil through secretion by glands and leaves that then create a favourable environment for many other organisms.

The mangroves produce prop roots (as in the Rhizophoraceae) and pneumatophores with breathing pores for diffusion of oxygen into the plants. The mangroves can propagate by means of viviparity i.e. germination commences in the fruits while attached to the tree with the seedlings dropping from the tree to be dispersed by water some distance from the parent tree. The mud, suspended particles and other sediments are an important component of mangrove ecosystems. Unicellular algae and blue green bacteria utilise the mud surface for photosynthesis. The mud surface offers both food and shelter for many filter feeders, detritivores, herbivores and predators, including fish and crabs. The mangrove pneumatophores, aerial roots and lower branches often provide shelter for algae, barnacles and oysters that are, in turn, consumed by higher predators.

A network of rivers, canals and creeks intersect this forest, thus creating a different set of habitats to that provided by other forest types in the country. It is also a habitat, nursery ground and refuge for many species of marine and coastal fishes, shrimps, crabs, molluscs and mammals (e.g. dolphin), several species of marine turtles, reptiles such as the estuarine crocodile and different species of monitor lizard. Shrimps and crabs are the most important crustacean and are abundant in mangroves worldwide.

Sundarbans supports total 291 species of fishery resources and constitutes an important commercial and artisanal fishery industry that produces fresh fish, iced fish, sun dried fish, smoked fish, salted fish, fish meal and shark's oil. Thus, Sundarban provides a considerable harvest of whitefish, shrimps, prawns, mud crabs, snails/oysters and billions of shrimp/prawn post-larvae for shrimp aquaculture farms. These industries support about 155,000 fishermen throughout the year.

Mangroves are located in estuarine areas and provide important habitats for fish e.g. nursery functions, shelter for juveniles and food for piscivorous species. The extent of dependence may differ between different species e.g. most species of Mugilidae found in sheltered estuaries or mangroves seldom occur in coastal waters. In addition, tropical clupeoids are estuarine dependent as juveniles. Others such as Asian Tenuulosa (Ilish) are estuarine dependent with reference to spawning grounds. It is noted

that predatory action of some larger fish are hampered due to mangrove structure although some individuals did penetrate these systems in search for food.

Mangroves play a nursery role for estuarine fishes. The mangrove forests are important for healthy coastal ecosystems because the forest detritus, consisting mainly of fallen leaves and branches from the mangroves, provides nutrients for the marine environment. These detritus support varieties of sea life in complex food webs associated directly through detritus or indirectly through the planktonic and epiphytic algal food chains. The plankton and the benthic algae are primary sources of carbon in the mangrove ecosystem, in addition to detritus. The shallow intertidal reaches where there is mangrove wetland provides refuge and nursery grounds for juvenile fish, crabs, shrimp and molluscs. The reasons for these dependencies may be described as follows:

(1) The trophic resources (e.g. convergence of riverine freshwater and tidal currents) produce large volumes of turbid water where organic particles and fragments are concentrated and subjected to strong microbial activity to release nutrients. The nutrient released is used by phytoplankton, at the base of a web including zooplankton and shrimps. Abundant food resources are thus made available to fish and shrimp post-larvae, with a range of planktonic food sizes matching their filtration and capture capabilities.

(2) Water turbidity and shade (e.g. turbidity and shade provided by the mangrove leaves and pneumatophores) reduce the perception distance of predators and increase the escape rate and consequently the survival rate of young fish and shrimps. Estuaries and mangroves are places where less fish predation occurs due to turbid water, absence of larger fish, shallow water and increased hiding places for juveniles in sea grasses or mangrove branch, roots, and pneumatophores.

(3) Structural diversity (e.g. diversity and structural complexity of mangroves and estuaries) offers trophic niches for different species and sizes. The higher concentration of food present in pneumatophore areas supports abundant fish species.

From the above discussion it is suggested that fish depend on mangroves and estuaries as nurseries (food and shelter) and that these habitats are important for juvenile and adult fish for their survival and growth. Hambrey, (1999) reported that economic valuation of the fisheries function of mangroves was estimated to range from US\$ 66 to almost \$3000/ha. Therefore, the worldwide estimates of the value of the mangroves to commercial fisheries have raised awareness about importance of mangroves. So the Sundarbans mangrove forest needs proper attention, management and political commitment for sustainable coastal fisheries development in the area.

Md Emdadul Haque is Divisional Forest Officer, Aquatic Resources Division, Sundarbans, Khulna.

# Let there be more Kigelia trees

MUSTAQUE QUADRY

MY attention has been drawn to the news item about the Kigelia tree, published on May 22 in The Daily Star. As per the news there are three Kigelia trees in South Asia. Again as per another recent news item about the same tree in a Bengali daily [Ittefaq, on May 7], there are thirteen trees in Asia.

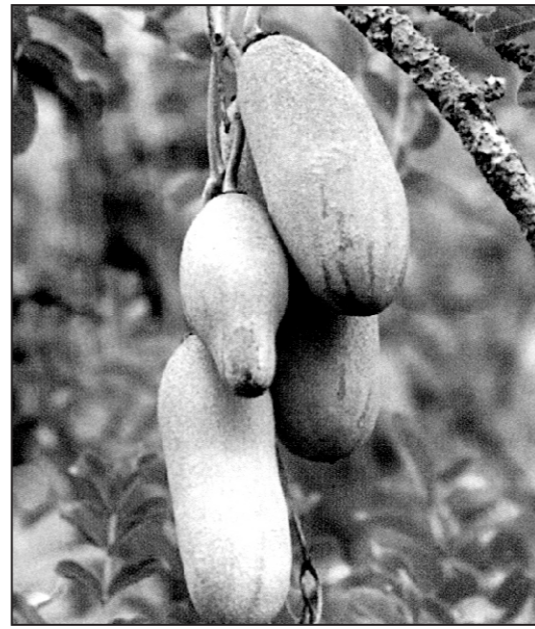
In my opinion, and the fact is that, there are more Kigelia trees even within our sub-continent. There are references of this tree even in some of the older publications on trees in India. Also in a very recent publication on "Trees in India" there are references of this tree as a popular ornamental one along with excellent photographs. There is a big Kigelia tree in the Botanical Garden at Calcutta which was planted in 1832. At the crossing of Hooker and Scott Avenue in Chandigarh, north-west of India there is Kigelia and it can be seen at V3 Road between Sector 22 and 23.

For enthusiast tree lovers, I would like to add some more information about Kigelia tree, worthy for environment with medicinal properties.

The tree is indigenous to Mozambique and several other parts of tropical Africa. The English name is Common Sausage Tree and the Botanical name is Kigelia africana. [Syn. Kigelia pinnata]. Common Indian name is Kajelia, Jhar Fanoos or Balam Khira. This is a remarkable tree owing to its beautiful velvety red-brown or wine red flowers, dense shade and peculiar-looking sausage type fruits. The flowers appear during hot season, usually anytime between March and June. Unfortunately, they are evil-smelling like that of bad meat and attract large number of flies. Flowers open during night and usually fall down before the following noon and are pollinated by bats.

This evergreen tree suits warm climate but also grows in humid tropics on good quality soil. Propagated mostly from seeds it grows very quickly under favourable conditions. It is a very good avenue tree with a rounded head and dense foliage and can be planted in large gardens and parks for its shade and peculiar-looking fruits. As its leaves are not eaten by cattle, it can be grown in places invaded by cattle. In several parts of Africa Kigelia is considered to be sacred. The fruit of this tree has medicinal properties although not edible. It is effective as a sore-dressing for syphilis patients and the bark is used to cure rheumatism and dysentery.

The tree is said to have been distributed in the sub-continent by the seeds obtained from a single fruit that was washed ashore to Bombay. Thomas David Baron Carmichael [not Baron Thomas Carmichael] the then Governor of undivided Bengal planted some saplings of Kigelia probably on 10th Day of December 1916, the same



Sausage or cucumber-like Kigelia fruit.



Wine-red colour Kigelia flower.

day the foundation stone of Carmichael College was laid by him. Two trees within the compound of the college still bear the memory of Lord Carmichael.

In this connection I would like to thank Prof. Mostafizur Rahman of Mymensingh Agricultural University for his rare endeavour in producing Kigelia saplings and request him to plant some saplings at Ramna Park, Curzon Hall compound of DU, Botanical Garden at Dhaka, so that amateur nature lovers can enjoy Kigelia's uncommon beauty in the capital city. And let there be more Kigelias in the environment of Bangladesh.

Mustaque Quadry is an architect.