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Protection of Mangroves in India

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Why is in news? Finance minister recently announced a new initiative for planting mangroves along the coastlines and on salt pans of India in her Budget speech this year.

A brief about Mangroves

Present in the lowlands of intertidal zones in most tropical and sub-tropical countries, mangroves act as the first line of defence during cyclones by preventing large-scale structural, ecological and livelihood damages.

They are particularly efficient in absorbing carbon dioxide from the atmosphere and are home to vital species in the blue carbon ecosystem and help prevent coastal erosion.

The Sundarbans, which cover 60 per cent of the area in Bangladesh and the remaining in West Bengal, are the largest continuous tracts of mangroves in the world.

Some three per cent of the mangroves in the world are found in India, accounting for more than 43-45 mangrove species, with the Sundarbans having the most area covered by them.

Climate change has caused the Sundarbans to experience a rise in sea levels and a decrease in salinity, which has changed the composition and hydrology of mangrove species, rendering further planting of mangroves along the coast ineffective (survival rate of less than 70 per cent).

Mangroves are regarded as great sinks for carbon sequestration. In the case of mangroves, above-ground and below-ground biomass needs to be calculated to evaluate the amount of carbon sequestered

An alarming 50 per cent of the world's mangrove forests have disappeared in the last five decades due to coastal developments, including climate change, logging and agriculture, according to the International Union for Conservation of Nature.

Uniqueness of Mangroves

Unique characteristic of mangroves is the way their seeds/propagules germinate.

The seeds actually germinate on the tree itself, and then fall off from the tree into the water, taking root only when encumbered by mud and sediment.

This is very unique adaptation in the mangroves that helps them perpetuate in the harsh saline conditions.

Scientifically, this condition is known as vivipary. What van der Stoken and his collaborators found was that the behaviour of these propagules – how far they disperse and where they get established – is affected by changes in sea surface temperature and salinity.

Mangrove propagule density is somewhere between that seawater and freshwater. Increasing surface temperature and reduced density can lower the floatation time, inhibiting the long-distance distribution of the mangrove propagules.

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Sensitivity to sea surface density varies between different mangrove species. For example, the propagules of Rhizophoraceae and Avicennia may be more affected by such changes as their densities are closer to that of seawater

Mangroves in India

In the Indian context, regional evaluation across the carbon stocks has not been done.

More importantly, carbon sequestration results from the constant addition of organic material into the soil, which is kept intact with the entwining of mangrove roots and their pneumatophores. Incidentally, these are where most plastic wastes accumulate and can lead to the suffocation of these roots.

Having tackled several such climate disasters in the past, Rotary Clubs in India closely work at district and state levels to build climate resilience

An analysis of a successful mangrove restoration model in Estuarine, Coastal and Shelf Science journal highlights two case studies, one in the urban coastal port of Mundra in Gujarat's Kachchh district and the second in a coastal rural area in Surat district.

The two case studies indicate that concerted efforts and collaboration between government agencies, local communities and the private sector could pave the way for mangrove restoration in India.

India is on course to devise a unique biodiversity conservation model through a holistic approach. The government has rolled out the MISHTI scheme as part of this effort

Climate change-induced sea level rise, tornadoes and cyclones have been impacting the lives and livelihoods of communities living around coastal ecosystems.

Mangroves are considered the best defenders of tropical coastal communities that suffer the most during such disasters.

Rotary Clubs in India encourage their members across the world to restore mangroves on a war footing. In India, they have been creating Miyawaki forests in various states. But it takes at least 40 years for these forests to sequester carbon. On the other hand, restoring mangroves will yield result in three years.

Significance of Mangroves

Mangroves are tropical forest ecosystems that occupy shallow, warm water in the intertidal region between land and sea.

Mangrove ecology is quite unique: the dominant trees in a mangrove ecosystem are capable of excreting salt from their leaves, and can tolerate the high salt content of seawater.

Another characteristic that mangroves are known-by is that of aerial roots.

This is a system of extensively developed adventitious roots – i.e. formed from non-root tissue – that extend above the water. Aerial lend physical support to the tree.