GOVERNMENT OF PAKISTAN

OPTIMIZING IMPACT INVESTING IN RESILIENT AND ADAPTIVE FUTURE OF PAKISTAN

NDRMF
MAKING PAKISTAN RESILIENT

PROTECTION AND REHABILITATION OF MANGROVES- COASTAL ECOSYSTEM

Mangroves are tropical plants that are adapted to loose, wet soils, salt water and being periodically submerged by tides. Four major factors appear to limit the distribution of mangroves: climate, salt water, tidal fluctuation and soil type.

Sindh has a massive potential for growing forests as total forest land under the control of Forest & Wildlife Department is 3.426 million acres, which is about 10% of Sindh's total surface area. Sindh forests are comprised of productive forest (Riverine & Irrigated) and protective forest (Mangroves and Rangelands).

Mangroves forests in Indus delta are one of the largest arid climate mangroves in the World.

Due to upstream diversion of water the health and sustainability of these mangroves was at stake. According to estimates of 1990's about 80,000 hectares (200,000 acres) of mangroves were in existence in the delta. With the continuous rehabilitation efforts of Sindh Forest Department about 300,000 acres have been planted alongside protection of existing mangroves. This is one of the largest attempts of mangrove rehabilitation in the World.

About 600,000 hectares (1,500,000 acres) area has already been declared as "Protected Forests". Out of that about 200,000 hectares (500,000 acres) area is under different age classes of mangroves. Four mangrove species namely: Avicenia marina, Rhyzophora mucronata, Ceriops tagal and Aegiceras carniculatum are present in the delta with Avicenia being dominant species.

NDRMF Interventions

NDRMF project has been conceived with the view to restore productivity of various Forest ecosystems including Mangroves.

in Thatta and Sujawal

55,000 acres
(22258 hectares)

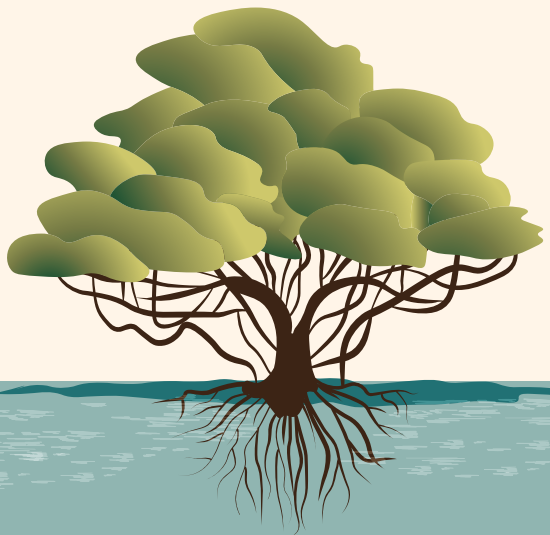
23.925 million
New mangroves will be planted

at a spacing of
(10 feet X 10 feet)

to address the growing concerns of sea intrusion and climate change. With an estimate that about 3.4% over all stocking of mangroves will improve and 10% new mangroves will be added to current stock of 510,000 acres alongside other interventions.

Following are the major intervention on mangroves

1. Afforestation on blank and de-vegetated mangrove areas of Indus delta over 55,000 acres
2. Each acre of mangrove plantation, planted with 435 plants at a spacing of 10 by 10 feet, can generate approximately 4,350 plants within 4 to 5 years. Therefore, for a target of 55,000 acres, it is estimated that around 263.175 million saplings will be produced (calculated as 55,000 multiplied by the sum of 435 and 4,350).
3. Protection, maintenance and restocking of Mangroves 55,000 acres with community watch and ward system.
4. Maintenance of newly raised mangrove plantations through family units. each Costal Negahban will protect 480 acres of mangrove forests.This will improve livelihood of the neighbouring coastal community besides creating ownership feelings among them.
5. Women and Youth nurseries development of fruit and fodder plants of 0.50 million saplings for self-sustenance of coastal communities.



PROTECTION AND REHABILITATION OF

MANGROVES- COASTAL ECOSYSTEM

BENEFITS OF MANGROVE FOREST

Coastal Protection

- Stabilize the coastline by reducing erosion caused by storm surges, currents, waves and tides.
- Buffer wave action during intense tropical storms reducing flood risk
- Mangrove peat absorbs water during heavy rains and storm surge, reducing the chances of coastal flooding.
- Protects from sea level rise

Soil Stabilization

Water Purification

Improves water quality by removing nutrients and pollutants from storm water runoff before they reach seagrass habitats and coral reefs. Filter and recharge water.

Fisheries and Marine species

Mangroves provide nursery habitat for many commercial fish and shellfish, and thus contribute to the local abundance of seafood.

Provision of habitat

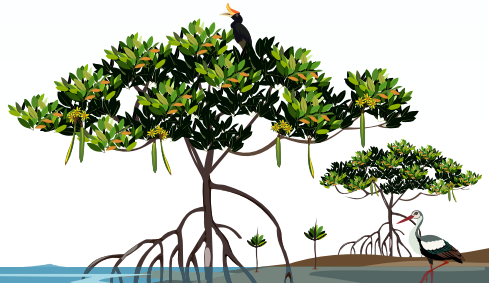
- Mangrove systems provide shelter to a range of wildlife species of birds and other animals
- Mangroves serve as nesting areas for coastal birds such as little blue herons, great egrets. Many birds depend on mangroves for part of their seasonal migrations. Even dead mangroves play an important role, providing roosting areas for bird species.
- Promotion of Blue Economy & Restoration of Marine Protected Areas (through restoration of mangroves ecosystem)

Livelihood

Coastal communities depend on them for their livelihood

Carbon Storage & Sequestration 'Blue Carbon'

- Mangroves play a great role in biologic carbon sequestration. They form ecosystems which scientists refer to as "blue carbon ecosystems" as opposed to "green carbon ecosystems" which are found on the land.
- Mangrove forests are able to store three to four times more carbon than the forests which are found on land.



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