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Pakistan Navy Mangroves Plantation Campaign







Muhammad Nawaz Sharif Prime Minister of the Islamic Republic of Pakistan

The people of Pakistan stand together with the international community in celebrating the International Day of Forests to create greater public awareness on the significance of natural resources, in particular of forests, in our lives and to emphasize the urgent need to take concerted actions to ensure that they are utilized in a sustainable manner.

Forests are a key factor in mitigating the impact of climate change on our ecosystems and in maintaining the balances vital to the sustenance of life on our planet. Sadly, however, deforestation continues at an alarming pace all around the world, and millions of hectares of forests are destroyed every year.

Pakistan is blessed with abundant natural resources, which are critical for us both in an ecological as well as an economic sense. The Government of Pakistan attaches high priority to environmental protection and conservation, and has legislated several laws and implemented a number of policies to achieve this objective. Our Green Pakistan Programme is aimed at increasing our forest cover through a strategy of accelerated afforestation and reforestation.

It gives me great pleasure and satisfaction to note here that Pakistan Navy has taken a key initiative in this regard by launching its Mangrove Plantation Campaign - a project to plant a million mangroves all along Pakistan's coastline before the end of monscon this year. This is, indeed, a most commendable effort, and will contribute in many salient ways in rehabilitating our threatened mangrove reserves,

I would like to avail this opportunity to commend the Chief of the Naval Staff and all naval officers for having launched a project of immense national importance.



Muhammad Zakaullah NI(M) Chief of the Naval Staff

International Day of Forests is a tremendous opportunity to celebrate our unique relationship to nature, forests and trees. This is the day for the whole world to celebrate nature and to appreciate the gifts that nature has bestowed on us in the form of forests and trees. I believe that forests are inextricably linked to our social and economic well-being and health of the ecosystem.

For centuries forests have been a source of food, fiber, livelihoods, resources and water for all the living beings on this planet. They are also well-paying in combating climate change and contribute in preserving natural resources for our next generations. However, these gifts of nature are eroding in the face of economic development, demand for domestic needs and urbanisation. Hence it is incumbent upon us to realize the impending perils and establish policies, laws and institutions that are required to implement sustainable forest imangement regimes.

Government of Pakistan has taken a lead in this drive and initiated the Green Pakistan Programme, which is considered a step in the right direction. Considering it as a national responsibility and following suit, Pakistan Navy has also launched Pakistan Navy - Mangroves Plantation Campaiga (PN-MPC) in 2016 aimed at planting around 1 Million Mangroves along the entire coastline of Pakistan. These mangrove forests would be home to a large variety of fish, crab, shrimp and mollusk species and will form an essential source of food for thousands of coastal communities along the coast. Studies have shown that there are as many as 25 times more fish of some species on reefs close to mangrove areas than in areas bereft of mangroves. This makes mangrove forests vital for commercial fishing as well.

Deforestation of mangroves along our coast has continued at an alarming rate. Hence, there is a need to remedy the situation at the earliest and make up for the lost mangroves' treasure. To achieve this, people in general and policy makers in particular need to be sensitized regarding economic and ecological importance of mangrove forests. PN-MPC, as an offshoot of Prime Minister's Green Pakistan Programme, will help raise awareness amongst masses about the significance of mangroves preservation.

Countinue...



Rear Admiral Waseem Akram HI(M) S Bt Commander Coast

As the head of the Coastal Command of Pakistan Navy, one of my tasks is to look after the welfare and welf being of the coastal communities, since most of them lay at the threshold of the society. Their prime source of livelihood is the sea and the bounties that it provides to them. They live close to the banks and use the sea as a source of nourishment, income and hygiene.

Mangroves have been a vital part of the ecosystem of Pakistan's Coastal Belt as it provides safety to the people by reducing the effects of cessation of river banks. It also allows fish to breed which end up as a source of earning and sustenance for the coastal communities. But the advent of hazards, both natural and manmade, neglect and lack of monitoring and requisite nourishment has reduced the number of mangroves along the coastal belt. Per hectare covered area of mangroves has reduced to almost one fourth its size than it was at the turn of the century. This fast depleting and deteriorating condition of one of the most important aspect of ecology of the coastal belt was a source of concern for both us and the local communities. For this purpose, a solution had to be sought, and that too in an early timeframe. Pakistan Mavy Mangroves Plantation Campaign was hence the need of the hour.

Under the able guidance of Chief of the Naval Staff, Pakistan Navy has embarked upon this fascinating feat of restoring the Mangrove forests to their former glory, and I am extremely happy and elated to be a part of it. Under the directions of the Naval Headquarters, my officers and men, in collaboration with various governmental and non-governmental agencies are all set to take on this challenge and play our part in serving the nation and its people. I have made it a point to have the civil society and specially university and college students, to become a part of this campaign because it is through them that we can spread awareness and ensure sustenance of such social projects.

I pledge a whole hearted support to this cause and my men and I would be forthcoming in tackling the odds and playing our parts in Prime Minster's Green Pakistan Campaign towards economic and social development of Pakistan in general and coastal community in particular.

Pakistan Navy and Coastal Command Zindabad. Pakistan Paindabad.



Dr. Asif Inam Director General National Institute of Oceanography

NIO congratulates the Pakistan Navy on this endeavor. Plantation of Mangroves along Pakistan coast should help increase the resistance of the coastline from imminent natural threats such as climate change and associated processes of sea water intrusion and land subsidence and human intervention such as felling and clearing etc. Mangroves are natural carbon sinks: they provide coastal protection, carbon storage, nursery habitat, and wood among other services. Pakistan use to have large mangroves forestis that provided rich nurseries for fish, crabs and shrimp but in years the natural cover have declined. It is important to understand that beyond a certain threshold, mangroves would no longer be able to provide the expected and significant coastal protection or fisheries benefits.

Natural causes of decline such as climate change, sea level rise are a threat to the mangroves habitat. Mangroves are the first line of defense against the sea, they become most vulnerable to sea level rise and of lowrelief with the lowering rates of sediment supply, like that observed in the Indus Delta.

It would be imperative that for mangroves conservation and resource management the sediment supply is also taken into account to ensure the survival, health of the delta and the restoration of mangroves forest.

Building capacity in the use of basemaps on Digital Terrain Models is one step forward towards the efficient management of the mangroves ecosystem. These would help identifying areas where mangroves are at most risk from submersion due to sea level rise. It is important that a National Mangroves Management Plan is formulated based on scientific and traditional knowledge.

Immediate actions are required to render protection to this amazing natural resource. Establishing coastal and marine protected areas, national parks and marine reserves are management tool to protect the imagroves habitat.

MESSAGES



Mahmood Akhtar Cheema Country Representative, IUCN Pakistan

It is a great honor for me to join hands with Pakistan Navy to commemorate the International Day of Forests. It also gives me immense pleasure to note that Pakistan Navy beside its duties to defend territorial integrity of Pakistan is actively involved to protect integrity coastline of Pakistan.

It is also greatly satisfying to observe that Pakistan Navy is very much aware of the significance of forests, particularly the mangroves forests that grow along the coastal areas of the country. Being aware of the valuable role of the mangroves forest, Pakistan Navy has from time to time carried out mangroves plantation along the Balochistan and Sindh coastal areas for the protection and conservation of the natural resources.

Mangroves occur at crossroad where occans, freshwater and land realms meet. They are among the most productive and complex ecosystems on the planet, growing under environmental conditions that would kill ordinary plants very quickly.

Research over the years has proved that mangrove forests provide protection and shelter against extreme weather events such as storm winds and floods, as well as tsunamis. Mangroves absorb and disperse tidal surges associated with these events.

During the Indian Ocean Tsunami in 2004, the coasts which had dense mangrove patches and plantations were least affected compared to coasts that were denuded of such forest cover.

IUCN has been working on sustainable development and part of this mission is also to create coastal sustainability. In fine with this mandate, Mangroves for the Future (MFF) programme has been underway following the 2004 Tsunami.

MFF is a unique partner-led initiative to promote investment in coastal ecosystem conservation. It provides a collaborative platform among the many different agencies, sectors and countries who are addressing challenges to coastal ecosystem and livelihood issues, to work towards a common goal

DAWN MONDAY MARCH 21, 2016



MFF addresses priorities for long-term sustainable coastal ecosystem management which include, among others: climate change adaptation and mitigation, disaster risk reduction, promotion of ecosystem health, development of sustainable livelihoods and active engagement of the private sector in developing sustainable business practices.

Pakistan's mangrove forest cover has declined rapidly over a period of past 80 years due to various anthropogenic reasons such as upstream diversion of Indus River flows.

This year's theme is "Forests and Water" as decided by the United Nations Forum on Forests and the Collaborative Partnership on Forests. As the theme "Forests and Water" goes for this year, both of them are essential for the survival of all the species on this planet. Forests play an extremely important role in controlling floods and soil erosion. Forests help in infiltration of rainwater and refailing of underground aquifers and cleaning of water.

Therefore, if we are conserving and protecting our forests, it simply means that we are protecting our water resources for our future generations.

The launch of the Green Pakistan Programme by the Honorable Prime Minister of Pakistan, Mr. Muhammad Nawaz Sharif, which entails plantation of 100 million trees, is a mighty step towards improving the fast depleting forests in the country

I appreciate the dedication and devotion of Pakistan Navy to the conservation and protection of the coastal natural resources. I believe, the PN campaign of planting one million mangrove trees would add significantly to the on-going forest conservation efforts and will encourage others to follow the same suit. On behalf of IUCN Pakistan and on my personal behalf I wish Pakistan Navy all the best in their endeavors in making Pakistan greener and healthier.

Countinue Message Muhammad Zakaullah NI(M) Chief of the Naval Staff

I am confident that this endeavour will lead to mangroves plantation on a massive scale along the Baluchistan and Sindh coast in a bid to support the nature and give a fillip to improve environment and build better Pakistan.

I urge public-private sectors and all segments of society to join hands with Pakistan Navy in this noble cause and commit to reversing mangroves deforestation, preventing forest degradation, helping to reduce poverty and promoting sustainable livelihoods for all forest-dependent people.

Pakistan Navy Zindabad - Pakistan Paindabad.

WWF

Rab Nawaz Senior Director Biodiversity WWF-Pakistan

Forests are natural assets that directly and indirectly benefit almost every living thing throughout the world and especially provide home to millions of life forms. store water, protect land from degradation, home to unique species, purifying air, removing pollutants like carbon and clean the environment. It also provides food, fodder and timber and other several services to millions of people. As an international standard the recommended forest cover is 25% of its total land however, Pakistan has unfortunately only 5.36% (4.72 million hectares) forest cover. The country has a rich diversity of forests and forest ecosystems starting from the mangroves to the high altitude mountains. The country is facing several challenges regarding forests beside deforestation; there are issues such as a looming water crisis and the introduction and promotion of exotic tree species that has catastrophic consequences on the existing forest.

Many people in Pakistan are not aware of the economic but the critical ecological role of the forests. One endeavour that WWF-Pakistan is undertaking is protecting and improving the forest cover through community participation approaches in close collaboration and involvement of the government as well as other stakeholders. WWF - Pakistan has planted saplings that covered more than 8,500 hectares in the Indus Deltaic creek systems. Similarly regular plantation of tree species with different corporate sectors and raising awareness about the importance of trees and forests are regular activities of WWF-Pakistan.

I strongly believe that forest conservation is not only the responsibility of the government but also of every Pakistani living in or out of the country. They should understand the ecological role forest play and everyone should participate in the efforts to increase the forest cover through plantation wherever they can. It is time to combat the challenges facing our forests and reduce our usage of wood based commodities e.g. paper, furniture, construction etc. or at least make sure they are sourced sustainably. WWF-Pakistan hopes for better forested future in Pakistan.

WWF-Pakistan is very happy to learn that Pakistan Navy is taking a lead in celebrating World Forest Day and mark the occasion with plantation of mangroves in coastal areas of Pakistan. I wish their success in this endeavor.



Protecting & Preserving the Maritime Frontier

Pakistan Navy is the guardian of the nation's sea frontiers. It has the added responsibility for the protection of coastal environment. On 'International Day of Forests'. Pakistan Navy is upholding its commitment to safeguard and preserve the mangrove forests and coastal eco system.

PAKISTAN NAVY

www.paknavy.gov.pl

DAWN MONDAY MARCH 21, 2016

Syed Ghulam Qadir Shah and Nadeem Mirbahar, IUCN Pakistan, Karachi

What Are Mangroves?

A mangrove is a woody plant or plant community which lives between the sea and the land, in areas which are flooded by tides for part of the time. Mangroves nake up one of the world's most unique cosystems because they thrive where no other trees can survive - in the ransition zone between the ocean and and. They are also among the world's most productive ecosystems

Mangroves have well developed coping nechanism for survival in harsh conditions. Their stift roots do not enetrate deep into the soil but extend ideways providing support to the stem. Mangrove plants cope with changes in alinity (high salt content, lack of fresh vater) by evolving both xeromorphic and halophytic characteristics. Their leathery, wax-like leaves help them reduce evaporation. In some species, the ultra-filtration by plant roots help them exclude heavy salt loads in their tissues, in others specialized salt gland help the plant excrete salt and in still others the salts are diluted by holding extra water in fleshy leaves. Mangrove have well adapted to oxygen deficient ent. Therefore, they have special breathing roots or pneumatophores which are above round (aerial) roots to counter oxygen deficiency.

Forty percent of mangroves occur South and Southeast Asia regions with Sundarbans in Bangladesh constitu the, single largest area of mangroves i the world, extending over 600,000 (ha n area. In Pakistan, they are found ng the coasts of the Sindh and the Balochistan provinces. They are most abundant in the Indus Delta which onstitutes 95% of the total mangroy over found in Pakistan whereas, the taining are found in small patches long the Balochistan province, at Miani Hor, Kalmat Hor and Jiwani,

Economics of Mangrove Ecosystem raditionally, mangroves were considered as mosquito breeding narshes of no economic values. In Pakistan, even today this traditional hinking exists in the attitudes of lanners and decision-makers who onsider mangrove areas as 'wastelands with little or up economic importance This thinking has evolved from centuries f ignorance and a lack of appreciation of the ecological and socio-economic alues of the mangrove ecosystem

At the micro level, mangrove ecosysten provides valuable goods and services to support local economy of the mities directly dependent on them whereas, at the national level i contributes to various macroeco sectors such as, breeding ground for fish and protection of installations and property in the coastal areas.

Mangrove ecosystem provides several direct (consumptive), indirect-use (nonconsumptive) and non-use values. These aclude, wood for local consumption fodder and grazing for livestock. especially camels, habitat and breeding und for shrimp and fish, protection ainst natural disasters, ecot rism and research, CO2 sequestration and coastline protection

The decaying organic matter from mangroves is broken down into free nutrients that are washed away to the sea. This serves to enrich coastal food webs, and with it, coastal fishery production. It is estimated that up to 80% of global fish catches are directly or indirectly dependent on mangrove-Millennium Ecosystem Assessm Report 2005 states that the annual market value of seafood fro s estimated at 7,500-167,500 USD per sq km

The studies conducted Philippines have estimated that 'one bectare of mangrove forest, if properly managed, will produce an annual yield of 100 Kg of fish, 25 Kg of shrimps, 15 Kg of crab meat, 200 Kg of mollusks and 40 Kg of sca

Pakistan's Coastal area is an arid- Subcucumbers'. In Ecuador, the overal shrimp yield of 767 Kg/ ha of mangrove tropical desert. The mangroves thrive at the mouth of Indus- the sixth largest forest per annum has been estimated The contribution of Mekong mangroves river and the Indus Delta- the fifth of Ream National Park, Cambodia the largest Delta. The Indus Delta is spread income benefits to the local communities and other ecosystem services were estimated to exceed US\$ 500/ ha/ year. Southern Arabian Sea Coast in Sindh. Out of these 260,000 hectares are In Egypt, total economic valu oves have been estimated to be Indus Delta swamps. USS 91.000/ ha/year at Ras Mohar and US\$ 24,000/ ha/year for the Naqb protected area.

the Indus border along the Sir Creek Mangroves act as a natural barrier against natural disasters such as, on the east, and the Hub River along velones and Tsunamis. Simulation the Balochistan Coast on the west. The Coastal region is about 350 Km long studies carried out in Japan have shown that a coastal forest of 200 meters width and can be divided into Indus delta may reduce the hydraulic force of a creek and Karachi Coast. three meter tsunami by at least 80 Ahmed (1951) divides the Coastal area percent, and flow velocity by 70 percent There is growing evidence that the of Pakistan into two regions. Lower mangrove covered areas suffered less Sindh Coast and Makran-Lasbella damage as compared to the deforested Coast. Annual rainfall decrease from areas during the recent Tsunamis which 220 mm to around 25 mm from west hit the Indian Ocean. The post-tsunam to east. The eastern part of the Coast studies on economic values of mangrov in Sri Lanka conducted by IUCN receives summer rain while the western revealed use values of healthy mangroves approximately US\$15,000 part receives winter rain. The mean annual temperature range from 32-40 ha and the protective values (value of property, livelihoods & infrastructure) °C, while extreme maximum values reaching as high as 50 °C. Wind travels approximately US\$3,000/ha. 7.5 to 20.5 Km/h during summer but in June it goes up to 130 Km/h.

Mangrove ecosystems have high itial to contribute to global clin change benefits through CO: sequestration. The mangroves on average have double the living biomas of overall tropical forests; this means that are the first choice to mitigate the carbon emissions.

A study conducted by National Institute

of Oceanography (NIO) pointed out

that sea-level along the Coast of

Pakistan has been rising approximately

1.2 mm per year. Its soil is alluvium

with plenty of clay. Soil contains

odium chloride, sodium carbonate

and nitrate, some calcium, which comes

rom shell fragments. The sub soil

cover about two-third of the surface

area. Estuary is a partly enclosed

one specie Avicennia marina is survived

Avicennia marina occupies about 99.9%

of total forest area, the dominance is

due to its resistance against adverse

environmental conditions (including

habit, hydrology and climate)

Currently three sub-species of

Avicennia are recognized. These are

in Indus delta.

as under:

Degradation of Mangrove Ecosystem in Pakistan The economic values associated with

mangrove ecosystem in Pakistan have not been fully understood and studied Hence, they are on continual pace of degradation due to several pressures.

It may be seen that most of the threats Coastal body of brackish water with are external in nature and impacting the one or more rivers or streams flow into mangrove ecosystem negatively. The it, and with a free connection to the disintegrated policies, weak enforcement, land and resource tenures open sea. Saline estuary soil has a ph 8.0-8.2 and the organic matter content and rigidity to reform conventiona is less than one percent. ance systems are the main cause of this state. As a result of these threat Mangroves vegetation is the species diversity and extent of characteristically present in river mangroves in Pakistan has been greatly altered of original eight mangrove estuaries and along the coast, where the land meets the sea. They are salt pecies found in the Indus Delta during tolerant trees. About 80 species of lifties, four have become extinct. The mangrove tree/ shrubs are recognized. mangrove cover has reduced from 345,000 ha during fifties to roughly of which around 50-60 species make a 150,000 ha at present and that too du significant contribution to the structure to reforestation schemes initiated of forests. Diversity of species is much uccessively by the Sindh Forest higher in the Southeast Asian region Department since mid-eighties and advocacy by IUCN and other civil where approximately two-third of all species are found. society organisations for their According to Flora of Pakistan (1972)

eight species of mangroves have been Investing in Mangroves: Is it wise? reported from Pakistan. In the aftermath of the Indian Ocear Tsunami of 26 December 2004, the role At present there are four maneroves of coastal forests in the mitigati species found in Indus delta. These are tsunami impacts became a hotly debated as under: topic. The post-tsunami assessment revealed that where mangroves and 1. Avicennia marina, - About 90% beach forests no longer existed, the 2. Rhizophora mucronata- about 8% damage caused by the tsunami was Aegiceras Corniculatum- about 1.5% enerally more severe and where co 4. Tagal- about 0.5%. orests were present they mitigated the

impact of the tsunami in many cases it was then the United States Ex-Today Indus Delta mangrove forest has become monoculture. According to President Bill Clinton's vision that Flora of Pakistan eight species of plants rebuilding in tsunami-hit areas should have been reported along the Coast of mprove natural infrastructure to trengthen resilience against future Pakistan, out of which four species have natural disasters. completely disappeared, three species are at the verge of extinction and only

This led to the formulation of Mangrov for the Future (MFF) initiative jointly y IUCN, International Uni onservation of Nature and the United ations Development Programme UNDP) in 2006. It initially focused on the countries that were worst affected v the tsunami i.e. India, Indonesia Maldives, Seychelles, Sri Lanka and Thailand and on expansion it included Bangladesh, Cambodia, Myanmar. Pakistan and Viet Nam.

By Farzana Panhar @ http://www.pkhope.com/

· Avicennia marina sub-sp. Australasica Avicennia marina sub-sp. Eucalyptifolia

Avicennia marina sub-sp. Marina

Avicennia marina commonly known as over 600,000 hectares along the grey mangrove or white mangrove is specie of mangrove tree classified in the plant family Acanthaceae (formally covered with mangroves mainly in the in the Verbenaceae or Avicenniaceae). It occurs in the intertidal zone of the Sindh Coastal region is located in the estuarine area. It distributed along Africa's East Coast, South and South outheastern part of the country between East Asia and Australia. It has aerial roots (pneumatophores), which grow to a height of 20 centimeters and diameter of one centimeter. This allows the plant to absorb oxygen, which is deficient in its habitat. These roots also anchor the plant during the frequent inundation of seawater in the soft substrate of tidal system.

> It thrives to achieve its full height in water, where both salt and fresh water are present. The species can tolerate high salinity by excreting salts through its leaves. It can be found in a soil ph. 6.5-8.0. The mangroves play a major role in the coastal eco-system. These ire as under:

As a pod of diversity they support diverse form of plants and animal life.

- Provide food, shelter and breeding ground for prawns, shrimps, fish crabs and other marine life. Annual export earning of US \$4 billions.
- Reduce wave action and helps stabilizing Coastal line.
- water table to the sea, which is from · Assimilate sewage water waste and .5 to 3.0 m deep with the water being heavy metals from industrial plants. ompletely brackish. The estuary plains
 - Protect sea-port from cyclone and reduce the intensity of cyclone.
 - Provide livelihood to local population living along the Coast line.
 - Source of wood for heating, cooking and fodder for livestock.
 - Provide shelter to migratory birds during winter

The following information is extracted from Prof.K.Kathiresan research paper.

Mangroves have high calorific value. hence more energy one ton of mangrove firewood can provide energy equivalent to five tons of Indian charcoal.

- The high amounts of tannin in mangrove wood make its timber more durable for furniture market
- The mangrove leaves are used in mats, baskets and roof making
- Mangroves attract honey bees and
- Mangroves especially Avicennia form
- cheap and nutritive feed for buffalos sheep, goats and camels.
- indigenous medicine for example Brugiera species (leaves) are used for reducing Excoecaria agallaocha for the treatment of leprosy and epilepsy.
- Avicennia marina (Avicenniaceae) i a species of mangroves tree used for treatment of small pox lesions in Persian folk medicine.
- Mangroves helps in protecting the Coast from solar UV-B radiation "green house" effect, and fury of cyclone, flood, sea level rise, wave action and Coastal erosion. Mangrove swamps act as a trap for
- sediments and sink for nutrients. The root system of the plant keeps the substrate firm and thus contributes

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Muhammad Moazzam Khan, Technical Advisor (Marine Fisheries) WWF-Pakistan

Mangroves are salt tolerate trees and usually found in intertidal along shallow waters, lagoon, delta and estuarine ecosystems, extending throughout the tropic and subtropical areas of the world. Pakistan is lucky that mighty Indus forms a very large delta, which is in the ranking in world deltas. Indus delta is known for its meandering creek system ome of which are known to have dense mangroves along its shore. A total of 54 species of mangroves are known in the world which spread over 110 tropical and sub-tropical coastal countries of the world

Indus Delta used to have 8 species of mangroves but due to several factors 4 species are locally extinct, namely Rhizophoraapiculata, Ceriopsroxburgh iana, Sonneratiacascolaris Bruguieraconjugata. Now in Pakistan there are 4 species remained which are nainly found in the deltaic areas of Indus River and in some small patches in Balochistan coast covering a total area of about 100,000 hectar which rank it the world's seventh largest mangroves forest. Avicennia marina in dominating species of mangrove found n both Sindh and Balochistan. Along Balochistan coast there are three locations where patches of mangroves are found. These include dense patch at Miani Hor (Sonmiani area) in Lasbela District, KalmatKhor and Panwan (Jiwani) in Gwadar District.

Four species of mangrove that are found in Pakistan are Avicennia marina Rhizophoramucronata, Ceriopstagaland and Aegicerascomiculata. Most common and dominant species is Avicennia marina which is found in all mangrove orests of Pakistan. Miani (Balochistan) is the only place where hree species Avicennia marina Rhizophoramucronata and Ceriopstagalare found naturally However, Sindh mangrove consist of Avicennia marina which cover almost 97% of the all mangroves forests of Sindh followed by Aegicerascorniculatum and some atches of Rhizophoramucronata which planted by forest department, IUCN, WWF-Pakistan and Pakistan Navy

Mangrove environment is considered to be significant as it supports a well-diversified animal life. Mangroves are important breeding areas of commercially important marine species t also provide nesting and resting place for variety of migratory and resident avian fauna. Several species of shrimps marine fishes and crabs are known to spend a critical part of their life in the angroves. Miani Hor and Kalmat Khor are important fishing grounds where high quality shrimp species are harvested. Mangroves along Pakistan coast are source of seeds of commercially important fish and shrimn species in the offshore waters Additionally there are important fisheries for jellyfish and mud crabs based in the mangrove area. It is estimated that of 140,000 metric tons fish landed annually in Pakistan about 25,000 metric tons is harvested in the area within mangroves which proves that mangroves are of immense importance.

Mangrove habitat provides important staging and wintering grounds for migratory shorebirds, flamingos and pelicans. Large flocks of little ringed lovers, sanderlings, curlew sandpipers Caspian terns, herring gills, lesser black backed gulls, and stender bill gulls are commonly found in the mangrove areas A large number of birds of prey including gosprey, Brahminy kites are found to roost in mangrove area Additionally a large number of terrestria birds are known from the area. Such high diversity of top predatory birds indicates that mangroves has rich productive ecosystem which can support on mangrove foliage. Camel and cattle browsing in large herds has become a a large number of predatory as well as shore birds. Most of these birds feed on invertebrate and fish fauna in the area.

Mangroves also provide a purturing environment for the fisheries of the area and helps in establishing the habitat as an important one which helps to regulate important life history processes of commercial fish species. The presence of mangroves and protected environment provide ideal habitat for a well-diversified marine fauna. In the angrove area even dolphins are found. Presence of a reasonably large population of cetaceans i.e. Indo-Pacif hump back dolphin and Indo-Pacific black finless porpoise in the mangrow area lagoon is indicative of the high productivity of the area. It is also eviden that food chain in the area is highly complex involving a series of plants and animals including seaweed and rich phytoplankton as well as detritus based food chain especially at lower trophi-levels whereas presence of predatory animals is also indicative of ecologica significance and high productivity of the area.

Mangroves ecosystem provides

various gears including bottom se

gillnet and cast nets. Pelagic fish mainly

consisting of sardinellas, anchovies

Indian mackerel, croakers, ribboufish

and toil shads etc. are caught with

surface gillnetting. Substantial part of

the catch of small pelagic fishes is sun

dried and transported to fish meal plant.

During the present decade two new

fisheries have been developed in

these include gillnet for catching

jellyfish during peak bloom periods of jellyfish. Jellyfish processing and

harvesting are an important part of the

fisheries sector of the area. During the

peak bloom season of jellyfish, mos

fishermen change their fishing operation

and engaged in catching jellyfish using

gillnets. Jellyfish is cured in the coastal

area which is now turned into an

important economic activity of the area

Catching of mud crab using traps and

tree spot and blue crab using bottom

sea gillnet are also important small

Mangroves have tremendous

recreational potential, as it has a wide

variety of habitat and diversity of marine

life especially birds. Even at present

when there are no adequate facilities

available, a large number of people visit

mangrove areas mainly for sport fishing

and picnics. In addition a number of

people also undertake recreational boar

rides mainly for bird and dolphin

watching. Now guided tours are

arranged in some areas in mangrove

by trained fishermen who involve

and swimming etc.

mangrove safari, dolphin and bird watch

All Mangroves along the coast of

Pakistan are protected. Sindh Forest Department, Balochistan Forest

Department, Port Qasim Authority and

Pakistan Navy are agencies responsible

for the conservation and protection of

mangroves in their areas of jurisdiction.

An important use of mangroves is for

livestock fodder and forage. Coastal

populations along coast of Pakistan

fodder for their cattle. Collection of

foliage is done by the womenfolk which

is major activity for them in the mangrove area. Livestock owners noted

an increase in milk production, which

rendered them income gains from

increased sale of milk and not having

to buy fodder from the market

In the Indus Delta area mangroves serve

as livestock forage for camels. Some

16,000 cameis and 11,000 cattle feed

major problem causing degradation of

pliect the foliage of mangroves as

scale operation in the area

mangroves along Sindh and Balochista

Continue. Mangrove Degradation and Conservation Planning in Coastal Area of Sindh, Pakistan swamps, often as algal mats on the

the mangrove stands in so Considering that mangroves have been denuded in some of its distribution range

due to cutting for fuel and fodder and as

there are areas along Balochistan coast

which is suitable for mangrove, therefore,

Sindh Forest Department, Balochistar

Forest Department, IUCN, WWF

Pakistan and Pakistan Navy have initiated

a major programme for planting of

mangrove along Sindh and Balochistar

coasts. The mangroves are planted in large areas in the estuary of the River

Indus, Phor and Hingol in Lasbela

District and Shadi Khor and Aakara Khor

in Gwadar District. In addition

plantation of mangroves has extensively been done in existing strands as well as

in the Gwadar (West Bay) and Sandspit

by regular plantation activities by WWF

Pakistan, Plantation of mangroves and

other conservation activities have resulted

n increased cover of mangroves in

Pakistan. In the Southeast Asia, Pakistan

is the only country whose mangrov

covers have increased in last 5 years

livelihoods to coastal communities surface of the mud. inhabiting the area, as it serves as important fishing ground for various types of fishing activities. Shrimping is National Coordinating Body Of Pakistan the most important economic activity in the area. Shrimp is being caught with

The NCB is a multi-stakeholder body headed by the Secretary Ministry of Climate Change. It was notified on 14 September 2009. Presently, it constitutes 24 members representing various government departments, civil society and private sector organisations. The membership composition includes 13 government organisations, five civil society organisations, three private sector organizations, two UN Agencies and one academic institution.

The membership of NCB continues to expand, as the process of joining has been kept flexible and open to relevant stakeholders. During 8th NCB meeting held on 24 October 2012, based on the interest expressed, the Ministry of Defence Pakistan and a private sector organisation, Pakistan Internal Bulk Terminal (PIBT) has been included as the new members of NCB.

Revision of National Strategy and Action Plan and Implementation of Work Plans:

Revision of NSAP has been undertaken and the draft report was presented during the 8th NCB meeting held on 24th October, 2012. NCB has recommended further consultation with the relevant stakeholder to finalise the output. The NCB has shown high level of commitment to get the revised NSAF adopted as a strategy for coastal areas a national and provincial levels after getting the document approved from the federal and provincial cabinets.

The revised NASP elaborates a road map for defining the scope of MFF PoWs in terms of knowledge management capacity development and mainstreamin of gender, climate change and private sector for integrated coastal resources management. It suggests a two tiered mandate for NCB as an overseeing and teering body for operational aspects of MFF Programme at the national level and for acting as multi-stakeholder forum that needs to be used as a launching pac for improved dialogue and for decision making pertaining for improved coastal management.

Further, under some of MFF intervention partnership building with other organizations and on-going programmes in coastal areas has been encourage including Sindh Coastal Community Development Project, Balochistan Partnerships for Sustainable Development, Pakistan Internal Bulk Terminal (PIBT), University of Karach and University of Sindh for awarene raising and implementation of field project related to mangrove conservation

web within the mangrove ecosystem helps in apiculture activities. Mangroves extracts are used in

population pressure for fuel wood and fodder collection have exposed this complex ecosystem to serve environmental and social stress in the form of loss of habitat and biodiversity decline in fish productivity these bring social and economic problems for the Coastal communities. Mangroves are the back bone of the

Coastal Communities. The economy and livelihood of these communities can be improved by initiating more schemes of rehabilitations of ecological system along the Coastline through plantations of mangroves, and start various schemes for training them in income generation activities, health care, environmental management skill organizational leadership's and skill

development. We can improve infrastructure by opening new schools, roads, drinking water supply, flood protection structure and water harvesting structures also provide safety against flood. This way we can control the further degradation of the Coastal area and manage its biological diversity. Pakistan's Mangrove Ecosystem: The economic importance of mangroves in Pakistan largely comes from the fishery resource that they harbor. An estimated 80% of the fish caught in coastal waters spend at least part of their life cycle as fry in the mangrove creeks, or depend on the food

Shrimp fishery is the major fish export of mangroves, accounting for 68% of the \$100 millions of the foreign exchange the country earns from fisheries exports. The mangrove swamps of the Sindh coastal zone are extensive, covering 243,000 hectares (ha) compared with 7,400 (ha) along the Balochistan coast. The zone also has large areas of bare mud flat. The system is intersected by large and small creeks that allow tidal water to move into and out of the area during the twicedaily ebb and flow of the tides. The mangrove swamps are made up of

several indigenous species of trees that are adapted to live in brackish water or sea water. The main species in the area is the black mangrove Avicennia marina, which has aerial roots growing up out of the mud. The swamps also have less common species of mangrow tree, the main one on the Sindh coast being the red mangrove Rhizophora mucronata. Both species of manerove

tree are important sediment and soil stabilizers. Several species of marine seaweed also grow in mangrove

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nutrients, helps in catalyzing agricultural activity. But the rate of erosion of mangrou forest found near Keti Bander was about 1.5 feet per day and from 1960's to 1980's the mangrove cover area has reduced from 604, 870 hectare to 104,000 hectares. Coastal area are vulnerable for two reasons: firstly rise

in sea level and secondly increased frequency and intensity of cyclones Reductions in inflow of fresh water from Indus on account of diversion of water for other purposes, inflow of pollutants from industries, navigational activities and intermix of industrial

effluents. Human and livestock

to a lasting stability of the Coast

· The mangrove systems minimize the

Coast from erosion.

action of waves and thus prevent the

Mangrove ecosystem produces large

leaves, branches and other debri

decomposition of the litter contribut

to the production of dissolve organic

matter (DOM) and the recycling o

amounts of litter in the form of fall

