

HISTORY OF MANGROVE MANAGEMENT IN MUMBAI



Published by
The Office of the Additional Principal Chief Conservator of Forests, Mangrove Cell
Maharashtra Forest Department





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Produced by The Office of the Additional Principal Chief Conservator of Forests, Mangrove Cell
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The Office of the Additional Principal Chief Conservator of Forests, Mangrove Cell
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Photo Courtesy: Mangrove Cell, GoI-UNDP-GEF Sindhudurg Project, GIZ-CMPA Project (Unless stated otherwise)

MANGROVES OF MAHARASHTRA IN NUMBERS

3
percent of the
world's mangrove area
is in India (4,740
sq km)

112
sq km of net increase
was seen in the mangrove
coverage of the
country, from 2013
to 2015

20
species of
mangroves is found
in M'tra, making it the
richest in species
diversity in the
west coast

30,000
hectares of
Maharashtra's coastal
area is covered by
mangroves

15,088
ha of mangroves
were notified on
government land as
'Reserved Forests' in
M'tra; the first
state to do so

32
percent of the
national increase
from 2013 to 2015
was contributed by
Maharashtra

72
species of
mangroves are
recognised as true
species, of which 32
are found in India

4
percent of India's
mangrove area is in
Maharashtra

FIVE YEARS OF MANGROVE CELL

By N Vasudevan



Mr. N. Vasudevan is the Additional Principal Chief Conservator of Forests, Mangrove Cell, a dedicated unit of the State Forest Department for mangrove and marine biodiversity conservation in Maharashtra. Mr. Vasudevan is an Indian Forest Service (IFS) officer with a Masters in Marine Biology from the Cochin University of Science and Technology and a Post Graduate Diploma in Public Policy and Management from IIM Bangalore. He is specially trained in Mangrove Management and was asked to head the Mangrove Cell in Maharashtra after recalling him from Central Deputation. He began the Cell from scratch, with minimal resources, and currently oversees all Mangrove Cell activities. He is also the State Nodal Officer for two important externally-aided projects on marine biodiversity in Maharashtra, a UNDP-GEF Project and another funded by the German agency GIZ. Mr. Vasudevan is also the Executive Director of “Mangrove and Marine Biodiversity Conservation Foundation” of Maharashtra, an autonomous society with the mandate to promote coastal marine biodiversity conservation through resource mobilisation from government, semi-government, non-government and corporate sources.

For his work on conservation of mangroves and marine biodiversity, Mr. Vasudevan has won the Maharashtra State Civil Services Award, 2017 for outstanding contribution to the conservation of mangroves, wetlands and coastal biodiversity; the ‘Sanctuary Asia’ Special Award for Wildlife Conservation 2015; and a Special Award from M.S. Swaminathan Foundation for his dissertation as part of the “International Trainer’s Training Programme on Conservation of Mangrove Genetic Resources”, Chennai, 1992.

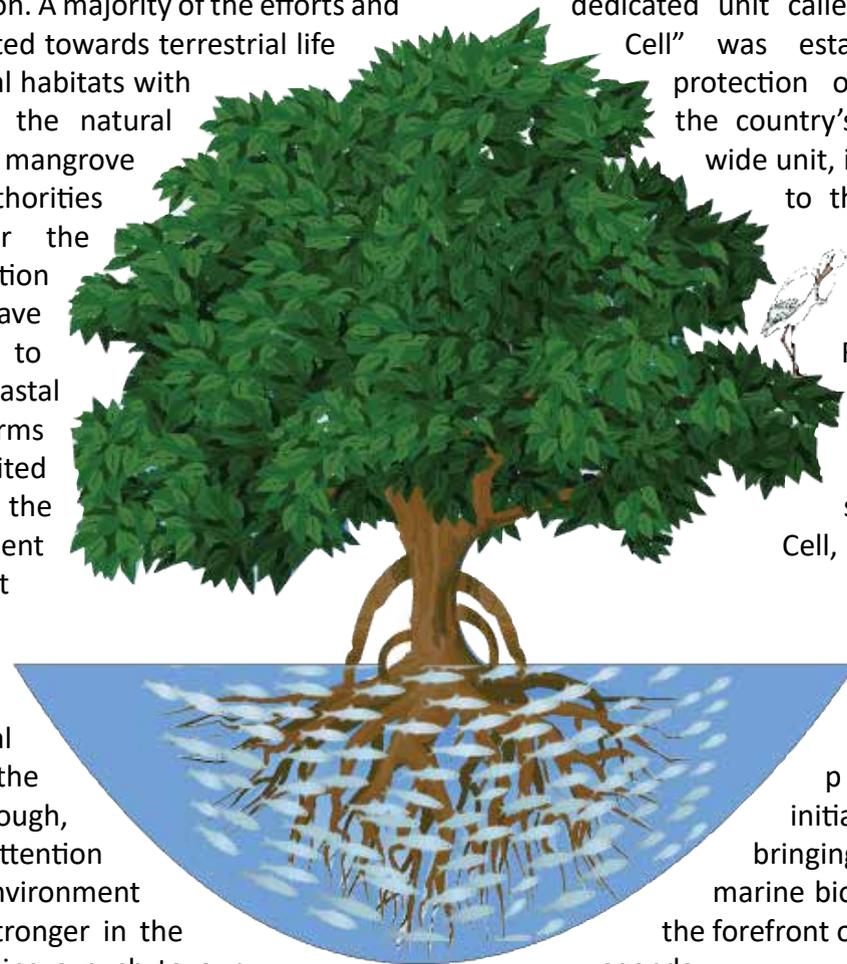
In the battle against climate change, the solution lies in nature. Along 4,000 square kilometres of India’s coastline, stand our defenders against climate change – Mangroves. Climate change is projected to bring more intense rainfall and storms, a sea level rise resulting in more soil erosion, flooding, and salinity in coastal regions, impacting people, infrastructure, and agriculture. Mangroves are complex structures which endure and contend with the impacts of climate change. By creating a thick wall where the land meets the sea, the roots of the mangroves hold tightly on to the earth preventing soil erosion, and trap CO₂ deep within the ground and away from the atmosphere where they contribute to global warming. They build a coastal defence system, protecting against storm surges and mitigating damages caused by tsunamis.

Every part of the mangrove has been naturally designed to serve a complex ecological purpose. In addition to their climate mitigation capabilities, mangroves also support a rich biodiversity. Mangrove forests are breeding and nursing grounds for marine species like fish, crab, shrimp and others which form an essential source of food for local communities. It is estimated that over 70% of commercially important fishes depend on mangroves for their nutrient cycle and nursery breeding. Medicines, fuel and animal fodder also find their source in mangrove areas. The diversity of mangroves and associated species provides great tourism potential and revenue generation for local residents.

Though the significance of mangroves in providing a rich host of ecosystem goods and services have been well documented since the last few decades, the global call for action on mangrove conservation only gained a prominent momentum post the Indian Ocean tsunami in 2004. Several studies were carried out post the tsunami indicating that death toll in villages with dense mangrove scrub was comparatively lower than the toll in villages without mangrove ecosystems. In Aceh, Indonesia for example, a detailed analysis of satellite images of the west coast by the University of Hohenheim, Germany, suggested that forests in front of settlements resulted in 8 per cent fewer casualties during the tsunami.

Today, in the global agenda towards mitigating Climate Change, mangroves are emerging as an important solution against global warming. An IUCN report has indicated that coastal habitats store up to 50 times more carbon in their soils by area than tropical forests, and ten more than temperate forests too. They also maintain the stability of the shoreline and prevent the release of toxic wastes into the coastal waters, a function that is particularly significant for a city like Mumbai, which has large swathes of mangroves around it.

Given the awareness around the importance of mangroves, there is yet much to be achieved in terms of conservation. A majority of the efforts and funds are still directed towards terrestrial life form, leaving coastal habitats with wanting more. As the natural guardians of mangrove forests and as authorities empowered under the Wildlife Protection Act, foresters have the mandate to conserve the coastal and marine life forms too. However, limited understanding of the marine environment and lack of relevant training and orientation tends to limit the focus on traditional boundaries on the land. Globally though, the case for more attention to the coastal environment has been getting stronger in the recent decades, giving a push to our



conservation efforts in India towards marine life as well. Between 2013 and 2015 there has been a net increase of 112 square kilometres in the mangrove coverage of India. Maharashtra contributed to 32% of this national increase during this period.

Around 30,000 square kilometres of mangroves exist on the coastal belt of Maharashtra for which several efforts are being taken towards conservation. The first step towards institutionalizing mangrove conservation in the state was taken on 6th October 2005 when the Bombay High Court passed an order to declare mangroves on Government land as Protected Forests. On 5th January 2012, a dedicated unit called the "Mangrove Cell" was established for the protection of mangroves. As the country's first such state-wide unit, its creation has led to the unprecedented extension of the activities of Maharashtra Forest Department to the coastal areas.

In a very short period, the Cell, despite serious staff shortage and resource crunch, has been instrumental in launching many path-breaking initiatives, and in bringing coastal and marine biodiversity issues to the forefront of our conservation agenda.

MANGROVES OF MAHARASHTRA

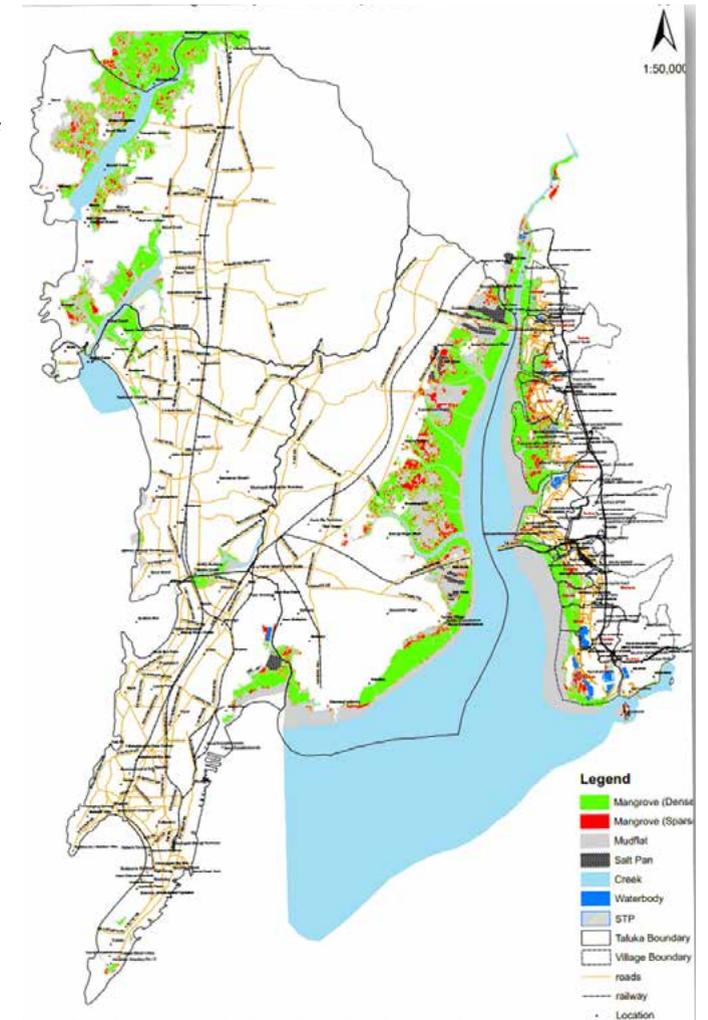
Maharashtra has a long coastline of about 720 km, interspersed by several rivers, creeks and backwaters. The 300 square kilometres of mangroves that adorn our coastal belt have as many as twenty different species, making it the richest in terms of species diversity in India's western coast. Maharashtra is also home to some of the rare coastal and marine species such as *Heritiera littoralis*, or 'Sundari,' which is found in large numbers in the Sundarbans in West Bengal. In the entire west coast, however, the only living record of the species is found in Sindhudurg, Maharashtra.

The vast expanse of mangroves is also inhabited by hundreds of mangrove associated birds, reptiles and mammals. Among the rich treasure trove of marine biodiversity lie unique life forms like sea grasses, corals, fishes, sea turtles, coastal birds, dolphins, porpoises and whales.

MANGROVE CONSERVATION IN MAHARASHTRA

The Bombay High Court order of 2005 directed mangroves on government land in Maharashtra to be notified as 'Protected Forests' and handed over to the Forest Department for management. By 2008, 54.69 square kilometres of mangroves in and around Mumbai were notified as 'Protected Forests'. In 2013, the State government ramped up efforts and elevated the status of mangrove forests on government land from 'Protected Forests' to 'Reserved Forests'. Today, about 150 square kilometres of mangroves on government land, in seven coastal districts in Maharashtra, are notified as 'Reserved Forests'.

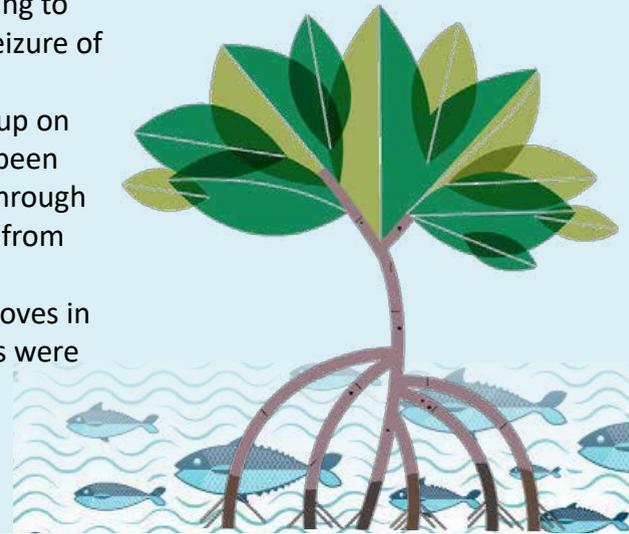
A Mangrove Cell was constituted by the Government of Maharashtra in the wake of serious public concerns about mangrove loss in the State, particularly in Mumbai and surrounding areas. The establishment of the Mangrove Cell in 2012 initiated a series of measures for conservation of mangroves in Maharashtra. From raising mangroves in nurseries and organizing regular large-scale plantations in degraded mangrove areas to conducting Clean Mangrove Campaigns and awareness programmes, the Mangrove Cell has taken a block by block approach to mangrove conservation. The Cell also facilitated the establishment of Mumbai Mangrove Conservation Unit in 2014.



Mangrove map of Maharashtra

ACTIONS BY THE MANGROVE CELL

- Hundreds of thousands of mangrove saplings were raised in nurseries for establishing mangrove plantations in different coastal districts.
- Saplings of all 20 mangrove species, including Rare, Endangered and Threatened (RET) species, found in Maharashtra have been raised at the nurseries.
- In the first three years alone, plantation programmes were carried out in over 2 sq. km. (200 hectares) of degraded mangrove areas in the Greater Mumbai region.
- Patrolling was intensified in mangrove areas, leading to the booking of a large number of offence cases, seizure of vehicles and arrest of offenders.
- Thousands of illegal shanties, which had cropped up on mangrove lands in various parts of Mumbai have been given notices for evacuation and many removed through a sustained campaign, overcoming stiff resistance from powerful forces
- In an effort to closely monitor the status of mangroves in Maharashtra, satellite mapping of mangrove areas were carried out, district by district, on a 1:5000 scale and the areas in the possession of Forest Department were demarcated on the ground with clear boundary markings



As a result Mangrove Cell's actions, the mangrove cover of the State registered a sharp increase. According to the "State of Forest Report 2015" published by the Forest Survey of India, the mangrove cover of Maharashtra, which had remained constant at 186 sq. km. from 2005 to 2013, jumped to 222 sq. km. by 2015 - a phenomenal growth of nearly 20%. It is extremely significant that the mangrove cover in the whole country grew by 112 sq. km. during this period, to which Maharashtra's contribution was 36 sq. km. In other words, Maharashtra, with just 4% share of the mangrove cover in India, had contributed to 32% of the national increase during the two-year period, from 2013 to 2015, the highest increase in mangrove cover in the country.

MANGROVE CONSERVATION THROUGH LIVELIHOOD PROMOTION

The key players in mangrove protection are local communities that have a symbiotic relationship with the ecosystem. Sustainable mangrove conservation by local communities can happen when they start deriving tangible benefits from protecting the mangrove ecosystem.

The launching of the UNDP-GEF Project on "Mainstreaming of Coastal and Marine Biodiversity in Sindhudurg District" in the latter half of 2012 gave Mangrove Cell the opportunity to initiate a number of innovative programmes for conservation of our coastal and marine biodiversity. Through the project the Mangrove Cell has sought to promote the organic link between conservation and livelihood. In order to increase the income-earning potential of mangroves, crab farming was introduced in several villages of

Sindhudurg with the support of the 'Marine Products Export Development Authority' (MPEDA), Kochi. Mangrove mud crabs are in great demand and get a high price in international markets where large quantities of crabs for consumption are imported. To meet this demand, aquaculture of crab farming is gaining importance. However, the real benefit of crab farming lies in conservation of the mangrove resource, through such income generating activities as mariculture of crabs in pens and ponds. Since mangroves provide healthy breeding grounds for crabs, the promotion of crab farming on private mangrove lands instils the need for mangrove conservation among the communities. Furthermore, crab farming serves as a resilient livelihood option for the coastal communities over traditional fisheries which are declining day by day due to various factors including delayed rainfalls, sea level and temperature rise. Crab farming is thus playing an important role in conservation of mangrove while meeting the livelihood needs of the coastal communities.

Under the Sindhudurg Project, Marine Product Export Development Agency (MPEDA) and Rajeev Gandhi Centre for Aquaculture (RGCA) had initiated Stock Enhancement Program of Mangrove Crab in Mangrove Pens and Tide Fed Farms in the coastal talukas of Sindhudurg District. Currently in its fourth crop, the activity has been introduced in 15 villages involving 179 beneficiaries, who have been trained through conduct of awareness visits and conduct of hands-on training at Rajeev Gandhi Centre for Aquaculture at Sirkali. The crab farming programme has been implemented in four phases and over 100,000 crablets have been stocked in approximately 30 acres of mangrove area. A detailed Environment Impact Assessment (EIA) study to assess the potential for crab farming in Sindhudurg, is also underway. This has not only led to the creation of substantial income for the farmers but also generated a renewed interest in the conservation of mangroves.

Another important livelihood activity that is being promoted by Mangrove Cell is the oyster culture programme for women's self-help groups in coastal areas. Oysters are highly valued sea food and considered a delicacy in USA, Europe, Japan and other international markets. In India there is a growing demand for oyster meat in some parts of the country. Until recently, oyster farming had been considered as a traditional practice followed only in the temperate countries. However, there is more awareness now about the potential for development of oyster farming in tropical regions and efforts are now being directed in its development under tropical conditions.



Beneficiaries of the crab farming programme in Sindhudurg.



Beneficiary of the oyster programme monitoring the growth of oysters in Wadatar, Sindhudurg.

The Sindhudurg coast, with a vast network of backwaters and creeks, has shown significant mussel and oyster resources. The Colleges of Fisheries, Ratnagiri was awarded a study to map the mussel and oyster culture potentials of Sindhudurg. Based on the study, 38 villages in the 3 coastal talukas viz. Devgad, Malvan and Vengurla were identified as a good resource for oyster fishery. Subsequently, a pilot project was initiated with technical support from the Central Marine Fisheries Research Institute (CMFRI) to demonstrate mussel and

oyster culture practices in Sindhudurg, taking advantage of the natural spat fall in the identified creeks and locations.

Oysters are natural filters with the ability to pump as much as 50-60 gallons of water a day. This helps trap nitrogen from the algae they eat and convert it into usable protein and keep coastal ecosystems healthy. Thus, bivalve farming is 'organic' in nature. Given the numerous ecological benefits of the activity, the Mangrove Cell has initiated steps for upscaling the programme at designated sites in estuarine areas by the local fishermen groups. Promoting oyster culture can help strengthen coastal livelihood and also address food security, acting as an adaptive means of resilient livelihood for the coastal communities over classic fishing which is declining due to various factors including delayed rainfall, sea level and temperature rise. Prior to the oyster farming programme in Sindhudurg, the women from the fishers' community would spend several back-breaking hours harvesting oysters from the rocks during low tide. Oyster farming on the other hand follows a simple method, which involves setting up of a bamboo raft with substrates in the creeks. The naturally available spat attaches itself to the substrates and in a span of twelve to fourteen months, the oysters achieve commercial size. The programme requires very little physical labour (mostly during the raft setting stage), and with low investment promises high return.

In a significant boost to the above programmes, the Maharashtra Government in its Annual Budget for the 2017-18 financial year has announced a fund allocation of 24 crores for setting up a multi-species hatchery and for promoting crab and bivalve culture. The multi-species hatchery can support crab farming an oyster and mussel culture in a big way across coastal Maharashtra.

Under the GoI-UNDP-GEF Sindhudurg Biodiversity Project, the Cell has also initiated several programmes for the conservation of our seas and the rich biodiversity that it supports. The first-ever scientific expedition to assess the biodiversity of Angria Bank was conducted in 2014 with the help of National Institute of Oceanography, Goa, using a Research Vessel called Sindhu Sadhna. Angria Bank is a shallow submerged plateau, spread across 600 sq. km, located at a distance of about 62 nautical miles off the Malvan coast. During the expedition, experts conducted dives at 15 locations in Angria Bank and gathered extensive information about coral reefs and the biodiversity richness of the bank.

To augment the coral growth around Malvan and to provide a healthy breeding site for marine species, deployment of artificial reefs and transplantation of corals were undertaken. Through the sea turtle conservation programme, a number of hitherto unknown turtle nesting sites were identified, nests protected and hatchlings released safely into the sea. Baseline studies were also conducted to assess the diversity and population of corals, coastal birds, sea snakes, otters, and bengal monitor lizards along Sindhudurg coast.

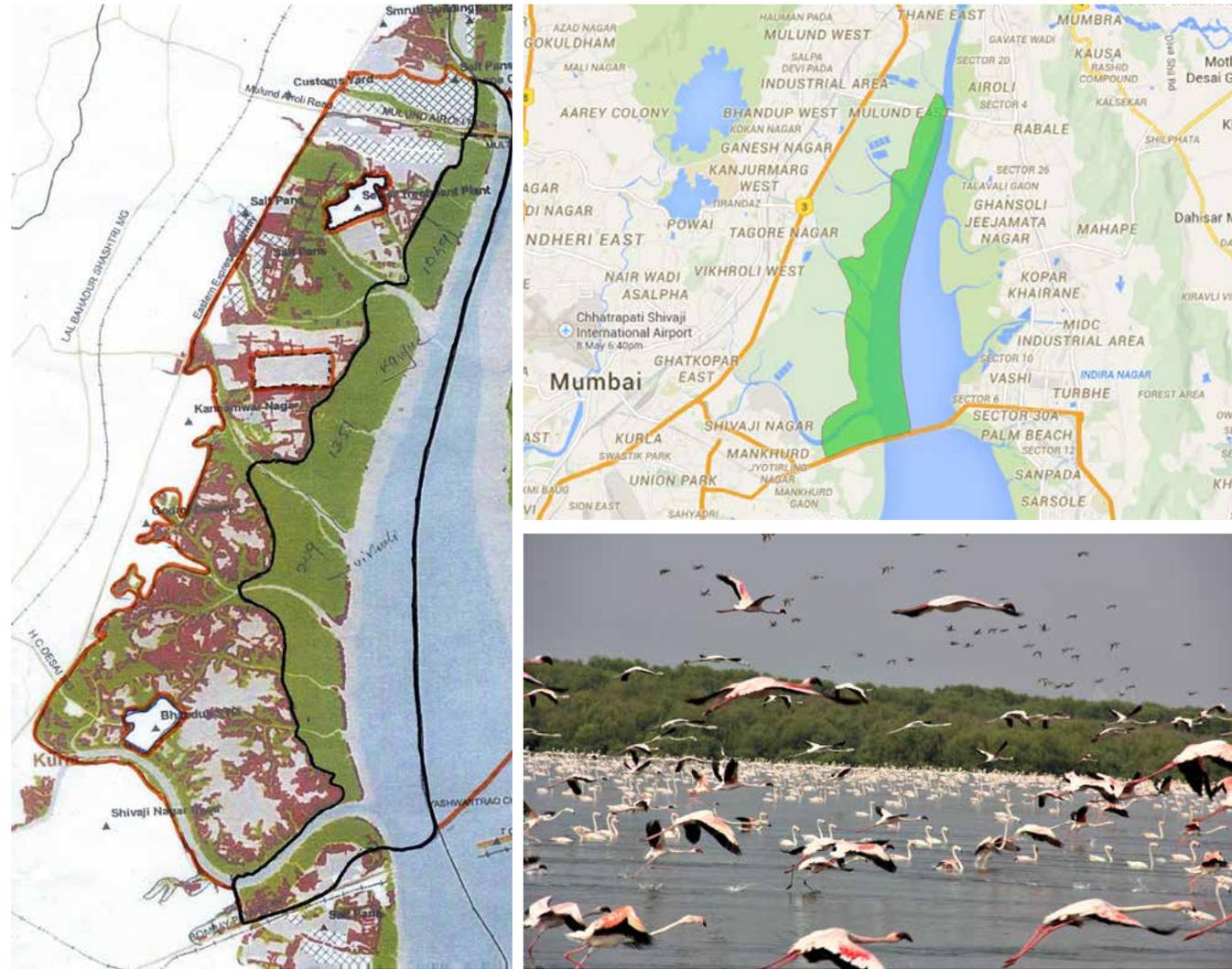
As part of the GoI-UNDP-GEF Sindhudurg Biodiversity project, population estimation of marine mammals like dolphins and finless porpoises were carried out for the first time in the country. Based on photographic analysis of fin characteristics, 572 individuals of Indian Ocean Humpback Dolphins have been identified along Sindhudurg coast. For the first time, blue whales and Bryde's whales could be photographed from Maharashtra coast, but more importantly, two blue whales stranded in different parts of Ratnagiri coast could be safely guided to deeper waters with the help of villagers in Ratnagiri. The Cell is now working on building a network of marine mammal conservation centres along the Maharashtra coast.

Based on the success of the Sindhudurg Project, the Government of Maharashtra announced a new scheme in the State Budget of 2017-18 for promoting livelihood programmes along the entire coast of the State. Rs. 15 crores has been budgeted for this new scheme during 2017-18.



Coral fragments have been deployed at the Malvan Marine Sanctuary to augment coral growth.

THE THANE CREEK FLAMINGO SANCTUARY



The Mangrove Cell undertook a major project for bird conservation in the mangrove-rich area of Thane Creek. Based on the 'International Climate Initiative' Agreement between Government of India and the Federal Republic of Germany, a bilateral project towards improving conservation of marine biodiversity called "Sustainable Management of Coastal and Marine Protected Areas" (SM-CMPA) has been launched in Maharashtra with the help of the German agency called GIZ. The project led to the notification of the Thane Creek Flamingo Sanctuary. This is Maharashtra's second marine sanctuary after the Malvan Marine Sanctuary in Sindhudurg. Spread over an area of about 17 square kilometres, it is home to over 200 species of birds, many of which are migratory like the splendidly-coloured flamingos which arrive in thousands in October-November. A 'Coastal and Marine Biodiversity Centre' has been set up at Airoli, Navi Mumbai, as part of the GIZ Project to serve as a gateway to the Sanctuary for tourists and environmentalists.

ENCROACHMENT REMOVAL



CLEAN MANGROVE CAMPAIGN



MANGROVE PLANTATION



AWARENESS DRIVES



CAPACITY BUILDING

With activities and projects in full swing, the Mangrove Cell simultaneously build a task force equipped to deal with the new and complex issues of mangrove management. A series of training programmes and exposure visits on mangrove conservation and various aspects of marine biodiversity conservation were conducted for forest staff, personnel from fisheries department, fishers' community, and other stakeholders in the coastal environment. Subjects like mangrove ecology, mangrove nursery and plantation techniques along with training on a wide range of subjects such as wildlife crime control (with specific reference to marine protected species), beaching and stranding of marine mammals, identification of marine mammals, turtle conservation, SCUBA diving and more, were conducted. Trainings and awareness programs were fine-tuned for focus groups like fisher folk, snorkelling guides, farmers, dolphin tour operators, homestay owners, rural women groups and others involved.

PARTNERSHIPS

Mangrove Cell has successfully demonstrated an inter-departmental approach towards marine and coastal biodiversity conservation, by partnering with a range of government departments such as Fisheries, Agriculture, Tourism, Revenue, Police, Urban Development, Revenue and Skill Development.

The Cell also forged strong partnerships with many leading national institutions and agencies, facilitating the introduction of state-of-the-art technologies and best practices to the Maharashtra shores. National Institute of Oceanography (NIO), Central Marine Fisheries Research Institute (CMFRI), Central Institute of Fisheries Technology (CIFT), Central Institute of Brackish Water Aquaculture (CIBA), Marine Products Export Development Authority (MPEDA), Wildlife Institute of India (WII), Salim Ali Centre for Ornithology (SACON) and Bombay Natural History Society (BNHS) are just a few names in that long and illustrious list of partners. Mangrove Cell also works with several NGOs, Citizen's Groups, educational institutions and private research organisations.

THE MANGROVE FOUNDATION

A new chapter in coastal and marine biodiversity unfolds with the recent 'Mangrove and Marine Biodiversity Conservation Foundation of Maharashtra' set up by the Government of Maharashtra. Through the Foundation, Governmental efforts in marine biodiversity conservation will be supported by the corporate sector, semi government and non-governmental organizations. This registered society will plan and execute programmes for conservation of coastal and marine biodiversity and promote research programmes and livelihood activities in the coastal sector. With a corpus of Rs. 115 crores (now enhanced to Rs. 140.75 crores), the Foundation is equipped with the necessary skill set and the operational flexibility to address the whole gamut of issues linked to coastal and marine biodiversity conservation and shall ensure the long term sustainability of the initiatives so far undertaken by the Mangrove Cell. The first major project for the Foundation is the implementation of a Mangrove and Marine Biodiversity Plan for Mumbai Metropolitan Region, for which Rs. 86 crores have already been received from the Mumbai Metropolitan Region Development Authority (MMRDA).

THE ROAD AHEAD

In five years of its existence, Mangrove Cell has played a crucial role in streamlining the conservation and management of coastal and marine biodiversity in Maharashtra. Led by N. Vasudevan, the Cell started from the ground up, with minimal resources, and has now evolved in to a model organization in the country. The Draft National Wildlife Action Plan (2017-31) in fact urges each coastal State to set up a similar body to strengthen the conservation of coastal and marine biodiversity.

The road ahead shows an exponential growth phase for the Mangrove Cell. In the coming years, with the support of the State, the Centre and international funding agencies (such as the Green Climate Fund), the Cell would be poised to realize its full potential.

Mangroves are the guardians of our coastline, our soldiers against climate change and supporters of a wealth of life along the coast. Our future relies on protecting our protectors and the Mangrove Cell is well prepared to take on this responsibility.

FIVE YEARS OF MANGROVE CELL



In October 2005, a Bombay High Court order directed that mangroves on government land were to be notified as 'Protected Forests' and handed over to the Forest Department for management.



In 2012, the Forest Department of Maharashtra ventured into the realm of conservation of coastal and marine biodiversity by creating the country's first such state-wide unit called the 'Mangrove Cell'.



In the latter half of 2012, the GoI-UNDP-GEF Sindhudurg Biodiversity Project was launched. It gave the Mangrove Cell the opportunity to initiate a number of innovative programmes for conservation of coastal and marine biodiversity in Maharashtra.



In 2013, the MMCU was constituted for protection of mangroves of Mumbai and adjoining areas. The unit is headed by a Divisional Forest Officer and has undertaken conservation works including mangrove nursery raising, mangrove plantations, clean mangrove campaigns, etc.



Based on the International Climate Initiative Agreement between Government of India and the Federal Republic of Germany, a bilateral project towards improving conservation of marine biodiversity was launched in Maharashtra with the help of the German agency GIZ in 2014.



The GIZ Project launch triggered the notification of the Thane Creek Flamingo Sanctuary, Maharashtra's second marine sanctuary after Malvan. Spread over an area of 1690 hectares, it is home to over 200 species of birds, many of which are migratory.



The Government of Maharashtra has recently set up a Mangrove and Marine Biodiversity Conservation Foundation of Maharashtra. It will be entrusted with autonomy to plan and execute innovative programmes for conservation of coastal and marine biodiversity.



A Coastal and Marine Biodiversity Centre has been set up at Airoli, Navi Mumbai, as part of the GIZ Project. It will serve as the gateway to the Flamingo Sanctuary and is expected to evolve into an educational and recreational centre focused on coastal and marine biodiversity conservation in Maharashtra.

HISTORY OF CONSERVATION OF MANGROVES IN MAHARASHTRA

By Debi Goenka



Debi Goenka is an environmentalist and Executive Trustee of the Conservation Action Trust, who started his love affair with the environment in 1974, during his college days, first as a volunteer with the World Wildlife Fund (WWF) and Bombay Natural History Society (BNHS). In later years, he has worked with WWF-India, has been elected to the Executive Committee of the BNHS for a number of terms, and has been associated in various other NGOs such as Bombay Environmental Action Group (BEAG), Society for Clean Environment (SOCLEEN), Indian National Trust for Art and Cultural Heritage (INTACH), Indian Heritage Society, etc. He has also served on various Committees appointed by the Bombay High Court, the Ministry of Environment & Forests, and the Maharashtra Government.

His work over the past 35 years has led to the protection of all coastal areas in India, the protection of mangroves in Maharashtra, the issuance of notifications by the MoEF for Dahanu Taluka, for Mahableshwar-Panchgani, for Matheran, for Numaligarh, etc. PILs filed by him have resulted in the protection of the Sanjay Gandhi National Park in Mumbai, the Melghat Tiger Reserve, the Radhanagari Sanctuary, etc. Other PILs have stopped the denotification of 3,500 square kilometers of Zudpi Jungles in Vidarbha, and the Private Forest Case has led to the protection of about 1,50,000 hectares of forests in Maharashtra. His campaigns against the Tata Power Projects at Trombay, the BSES/Reliance project at Dahanu, and the Enron project at Dabhol have also been notable.

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I cannot really remember when my love affair with mangroves started. I remember reading about mangroves in my childhood, and was fascinated with what I read – a secret mysterious world waiting to be explored, full of exotic creatures – a world that was inhabited by snakes, crocodiles and tigers; a world from which shipwrecked sailors found refuge from pirates, or where pirates found refuge from the navies – these were my childhood dreams.

Reality was quite different. I still remember with horror one of my first site trips to the neighbouring Raigad District in 1983. We had been invited by the State Government to accompany a group of Government officers and industrialists who were being taken around by the Collector to identify sites for location of coastal industries. One of the first sites shown to us was the beautiful beach at Mandwa. I still cannot decide whether the Collector was serious or joking when he said this pristine beach was suitable for ship breaking! But worse was in store – we were taken to the Rewas jetty, (which is surrounded by a vast expanse of mangroves), and the Collector proudly informed the group that about 100 hectares of land could be made available for industrialisation within 3 months by reclaiming this “wasteland”. I couldn’t believe my ears – this time I was sure he was not joking – and I launched off into an impromptu lecture on the importance of mangroves and wetlands, much to his embarrassment. There was general disbelief when I pointed out the crucial role of mangroves in the marine ecosystem – the fact that they provide invaluable and irreplaceable habitats for a wide range of breeding fishes, the fact that they provide nutrients to marine life, the fact that they act as land builders and protect the coast from storm damage and erosion – all these factors meant little to the Government officers or to the industrialists. This was all dismissed with a shrug, and a remark that industries were more important than mangroves. Looking back in time, I think this was a crucial day for many of us, and the battle to protect the mangroves was joined.



The role of wetlands and the fact that wetlands are some of the most productive eco-systems in the world has still to be recognised in practice. And the fact that our coastal zones are some of the richest and biologically most productive areas is still not being factored into the decision-making process. Basically, the coast is the interface between the land and the sea. The fact that the first life forms evolved from the sea, and gradually migrated to the land via the inter-tidal zones is something that very few people acknowledge. And the fact that several tens of millions of people depend on the coastal bounty for their survival, is also a factor that does not seem to influence decision-making.

India is probably the only country in the world that has legislation in place for protecting the entire coastline of the country - and it is not only the actual coastline that is protected but also the land between the High Tide Line (HTL) and the Low Tide Line (LTL) as well as the land extending to 500 metres from the highest HTL. Indeed, February 19, 1991 will go down as one of the greatest and most glorious days for the protection of the country's coastal environment, for it is on this day that the Coastal Regulation Zone (CRZ) Notification was issued by the Government of India, Ministry of Environment & Forests (MoEF). The Coastal Regulation Zone Notification, or CRZ notification as it is universally known, is perhaps one of the most forward-looking pieces of legislation in India. Not surprisingly, it is also one of the most controversial of the environmental laws of our country today.

The genesis of the CRZ notification lies in a simple letter that the then Prime Minister of India, Mrs. Indira Gandhi, wrote to the Chief Ministers of all the coastal states on 27th November 1981, directing them to ensure that the entire coast line of India should be protected from environmental degradation. In her letter, Mrs Gandhi also stated that the 500-metre strip of coastline should be kept free of all unnecessary development. The Chief Ministers were also asked to get a Coastal Zone Plan prepared for their respective States and get the same approved by the Central Government. Unfortunately, since the Prime Minister's directive had no legal basis, it was never really seriously enforced anywhere in the country. No State Government complied with the directive of preparing Coastal Zone Plan. It was in this background that the CRZ Notification of 1991 was issued.

As far as mangroves are concerned, the important fact to note is that mangroves were included in the CRZ I category which was defined in this notification as:

"Areas that are ecologically sensitive and important, such as national parks/marine parks, sanctuaries, reserve forests, wildlife habitats, mangroves, corals/coral reefs, areas close to breeding and spawning grounds of fish and other marine life, areas of outstanding natural beauty/historical/heritage areas, areas rich in genetic-diversity, areas likely to be inundated due to rise in sea level consequent upon global warming and such other areas as may be declared by the Central Government or the concerned authorities at the State/Union Territory level from time to time."

The other important provision that was built into this notification was that buffer zone of 50 metres around the mangroves were to be kept free of all "development". However, looking back, it now seems incredible that a notification like this got gazetted at all.

NON-IMPLEMENTATION OF THE NOTIFICATION

Even after the issue of CRZ notification in 1991, no State Government had prepared a CZMP even by mid 1993. This provoked a Writ Petition being filed in the Supreme Court of India by the Indian Council for Enviro-Legal Action. In the wake of a series of orders from the Supreme Court of India, coastal States started preparing 'State Coastal Zone Management Plans' and finally, on September 27, 1996, the CZMPs were conditionally approved by the MoEF.

The State Governments were asked to collect various types of information, from sources specified by the MoEF, and superimpose these on the maps approved by the MoEF. Thus, for example, information regarding the breeding grounds for turtles was to be collected from the Wildlife Institute, Dehradun; information about mangroves, mud flats, coral reefs were to be obtained from the Space Application Centre, Ahmedabad. A two-month period was provided for this purpose. In the interim period, States went ahead with many developmental works in CRZ areas. Cities like Mumbai also witnessed proliferation of slums in mangrove and intertidal areas.

Another major threat to the coast line has been the aquaculture projects. Supposedly meant to increase the marine exports, these projects have been environmental disasters. Most of the aquaculture projects have come up in areas that are rich in mangroves. So the first step has been to invariably build embankments with the intention of blocking the flow of tidal water and thus killing the mangroves.

Secondly, to maintain the salinity of the sea water at the desired levels, the ground water is ruthlessly exploited to compensate for evaporation losses, thus depriving the local communities of their drinking water sources. This form of over-exploitation also results in salinity ingress. And finally, since the modern high-tech aquaculture centres rely on high dosages of nutrient feeds laced with antibiotics to maintain high growth rates, the impact of the wastes that are pumped out into the natural ecosystem are catastrophic. Not only are the local fish populations decimated, but the spread of bacteria and infections ultimately results in even the aquaculture ponds from being wiped out. And yet, hundreds and thousands of new aquaculture projects were coming up, particularly along the east coast, until the Supreme Court stepped in and put a stop to it.

MANGROVES PETITION IN THE BOMBAY HIGH COURT



Illegal encroachment in mangrove areas.

Courtesy: Debi Goenka

Mangroves in and around Mumbai have undergone massive destruction. It is believed that about 70 per cent of Mumbai's mangroves have been destroyed due to various developmental activities. In spite of all the protection accorded by several Acts, the mangroves continue to face the onslaught in Mumbai, regardless of all the efforts to get the authorities to implement the CRZ notification.

With the objective of protecting the remaining mangroves in and around Mumbai, I filed a Writ Petition

in the Bombay High Court in 2004 seeking the Court's intervention to prohibit the destruction of Mangroves. The direct result of which was a winning order that was passed by the Hon'ble High Court on 6th October 2005 that clearly states that:

- There shall be a total freeze on the destruction and cutting of mangroves.
- All construction and rubble/garbage dumping on the mangrove areas shall be stopped forthwith.
- Regardless of ownership of the land, all construction taking place within 50 metres on all sides of all mangroves shall be forthwith stopped.
- All Government owned land would be notified as Protected Forests and handed over to the Forest Department.



District	Area (ha)
Mumbai	277
Mumbai(sub)	3723
Thane	2063
Sindhudurg	487
Palghar	2908
Raigad	4193
Ratnagiri	1436
Total	15088

PROTECTION OF MANGROVES

The filing of our case for the protection of Mangroves has led to more than 5,500 hectares of mangrove areas in Mumbai, Navi Mumbai and Thane being notified as "Protected Forests". These areas have been handed over to the Forest Department. Our continuous efforts and advocacy have led to a special Mangrove Cell being created within the Forest Department. The Mangrove Cell is headed by an officer of the rank of Additional Principal Chief Conservator of Forests, and has been entrusted with the responsibility of protecting mangroves in Maharashtra.

The notification of the mangrove areas as Protected Forests has had a tremendous impact within Maharashtra. Not only has this prime real estate been taken out from the clutches of the builders, but even Government agencies that had no compunction about destroying mangroves have now got to face the scrutiny of not only the citizens and the NGOs but also that of the High Court. Hence, now even the Government agencies can no longer destroy mangroves with impunity.

The Maharashtra Forest Department has recently decided to declare all mangrove areas owned by Government as "Reserved Forests" under the Indian Forest Act, 1927. However, some lands are still awaiting notification and transfer to the Forest Department.

PROTECTION OF MANGROVES AT MALAD CREEK

On 4th July 1996, the MoEF accorded environmental clearance for the construction of a golf course near Malad Creek. Following multiple complaints from NGOs and local residents that this area was covered with mangroves, the MoEF constituted a committee to investigate the matter. Based on the report of the Committee, the CRZ clearance for this project was suspended on 27th September 2002.

The project proponent challenged the suspension of this clearance in the Bombay High Court. The High Court stayed the suspension of the CRZ clearance and allowed the project proponent to proceed, subject to the final outcome of this Petition. The High Court order was challenged in the Supreme Court by Bombay Environmental Action Group (BEAG). On 15th April 2004, the Supreme Court stayed the Bombay High Court order until the disposal of the Writ Petition. Subsequently, the Bombay High Court directed the MoEF to give all the parties a hearing within 6 weeks and to pass a reasoned order.



A patch of healthy mangroves in Mumbai.

Courtesy: Debi Goenka

However, though the parties were given a hearing by MOEF on 27th September 2004, no order was passed. The Bombay High Court again directed the MoEF on 27th April 2012 to pass a reasoned Order within 8 weeks. The project proponent thereupon informed the MoEF that they did not wish to proceed with their project and sought to withdraw their Writ Petition in the High Court.

VERSOVA CASE

One of the biggest beneficiaries of this order has been the mangroves of Versova. In 1994, land covered with mangroves was allotted by the Collector to several societies at Versova in Mumbai. The construction of these buildings was challenged in the Bombay High Court, and after very protracted arguments, admitted by the Bombay High Court. An interim order was also passed against the construction of new roads through the coastal plots. After a few years, a local residents group also filed a separate petition in the Bombay High Court. However, thanks to the Bombay High Court Order declaring the mangrove areas as “Protected Forests”, the Versova residents were able to show the High Court that this area was also now protected, and thus benefited greatly from the effort of our team of lawyers.

DELAY IN NOTIFICATION FOR THE REST OF MAHARASHTRA

In view of the delay in notifying the balance areas as Protected Forests, a further order was passed to protect the mangroves in Thane, Raigad, Ratnagiri and Sindhudurg Districts. As per this Order, ‘no non-forest activity should be permitted by the respondent state in these mangrove areas throughout the state of Maharashtra, which shall be subject to section 2 of the Forest (Conservation) Act 1980 and Environment Protection Act, 1986 and Rules, without taking permission from the competent authority’.

DAHISAR CASE

One of the direct fallouts of Conservation Action Trust’s (CAT) work on mangroves was the Dahisar Mangrove Case. Here, a local developer, attempted to take over a huge 430-acre mangrove-covered site for a private development. In the field, CAT’s team was repeatedly threatened, attacked at least twice and had its equipment stolen. We carried on the battle along with a local residents’ group and were able to stop the destruction of these mangroves.

SUPREME COURT’S ORDER ON DAHISAR CASE

Based on these orders, Supreme Court also rejected the plea of a local builder at Dahisar, who had constructed new bunds and dumped thousands of truck-loads of debris so as to take over a huge 430-acre mangrove-covered site for a private development.

HIGH COURT’S DISMISSAL OF JAYESH SHAH’S APPEAL

The same builder after flouting the orders of the Supreme Court in the matter of removal of debris and to restore the original bund filed a petition challenging the action of the Collector who had seized his bank accounts and had recovered Rs. 1.25 crores as dues to be paid to the Contractor who had removed the debris. The High Court rejected the builder’s pleas and passed strictures against the builder.

We have now been recommending that this Supreme Court order be used to restore mangrove habitats wherever mangroves have been illegally destroyed and to recover the costs from the project proponent or the land owners.

MANGROVE CELL



Forest Officers from the Mangrove Cell inspecting a Government Protected mangrove area.
Courtesy: N Vasudevan

The creation of the Mangrove Cell exclusively tasked for the protection of mangroves is beginning to have an impact, even though the Cell is still short of personnel and has still not been given possession of all the mangrove areas in Maharashtra. The creation of this Mangrove Cell has also made Maharashtra the leader in the protection of marine biodiversity in India.

FUTURE ACTION

It is imperative that any fresh investments along the coastline should be critically examined keeping in mind the fact that vast stretches of our coastline would probably be submerged within the next 30-50 years as a consequence of Global Warming. Storm/cyclone damage is also likely to escalate over the years. An expert agency should be asked to do a report on the impact of Global Warming on coastal areas.

The need to permit only genuine local inhabitants to continue to expand their dwelling units to cater to natural growth – outsiders should not be allowed to masquerade as locals.

Coastal zone management plans are required to be prepared on a scientific basis by an institution that enjoys high credibility within and outside the Government.

Politicians must also be made aware of the fact that Climate Change is now a reality. The effect of Climate Change as a result of Global Warming will result in the rise of sea levels. At a national level, such changes could lead to the submergence of vast areas of Bangladesh, leading to a massive influx of ecological refugees into India. Cities like Mumbai, which in any case gets submerged with 10 centimetres of rainfall, will also be affected. As I never fail to mention, automobile pollution would not be a problem in Mumbai 30-50 years down the line – not because automobiles would be non-polluting – but because we would all be commuting by boats!

ACKNOWLEDGEMENT AND THANKS

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