

GOI-UNDP-GEF PROJECT



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Sindhudurg: Callous tourists cause pollution

The Sindhudurg beach clean-up campaign that was initiated by the state government and the United Nation Development Programme last Saturday, covered 120 km of the state's coast or 28 beaches of Konkan. An assessment of the waste cleared has shown that irresponsible tourists are littering the place, as a high number of beverage and glass bottles and food packets were found.

In all 4,456 volunteers participated to clean 28 beaches and 1,40,476 trash items were collected over a stretch of 120 kms.

"Some of the key findings of the Sindhudurg Clean Beach Campaign included high numbers of plastic beverage bottles (30,881), glass bottles (21,167), clothing and footwear (19,040), plastic bags (15,165), food wrappers and containers (12,904). This clearly indicates that most of the marine pollution in this area is due to irresponsible tourists on Sindhudurg's beach fronts," said Simit Bhagat, communication and outreach specialist for the project. The other finding is that there are inadequate waste disposal facilities on these beach fronts, resulting in marine pollution. It can be curbed only by way of upgrading existing waste disposal mechanisms as well as awareness programmes.

"The results of these findings will be used in preventive and corrective measures," said Mr Bhagat.

Konkan to get village-level biodiversity action plans

Akshay Deshmane

Monday 28 January 2013

UNDP and Maharashtra government to prepare plans in consultation with gram sabhas, panchayats

Sindhudurg district's coastal villages will soon have local, village-level biodiversity action plans. As part of a joint initiative being undertaken by the United Nations Development Programme (UNDP) and the Union and state governments, the Maharashtra Forest Department has roped in two voluntary organizations to conduct consultations with locals and recommend an action plan for each village.

Forest officials and members of the NGOs involved say the action plan will recommend integration of sustainable community livelihood activities with biodiversity conservation.

What UNDP proposes

The Sindhudurg Coastal and Marine Ecosystem (SCME), located on the west coast of India (Maharashtra) is one of the 11 ecologically and economically critical habitats identified along the Indian coast. There are 367 species of marine flora and fauna in the area, which include 73 species of marine algae, 18 species of mangroves, 11 species of corals, 73 species of molluscs, 47 species each of polychaetes and arthropods, 18 species of sea anemones and 74 species of fishes.

The UNDP intervention seeks to achieve the following: (a) cross-sectoral planning framework that mainstreams biodiversity conservation; (b) enhanced capacity of sector institutions for implementing biodiversity-friendly fisheries management plan, ecotourism management plan and Malvan Marine Sanctuary management plan; and (c) sustainable community livelihoods and natural resource use.

By the project end, it is envisioned that production activities in at least 6,327 sq. km of SCME mainstream biodiversity conservation objectives, in turn improving the conservation prospects of critical species and ecosystems, apart from contributing to the sustainable development of the region.

“Usually, the participatory rural appraisal (PRA) approach is adopted to make overall village-level development plan. However, for the first time, we are focusing this approach for biodiversity conservation and combining it with livelihood concerns to involve local people,” said Vasudevan Nair, chief conservator of forests (mangroves) for Maharashtra.

The 185 villages identified are in the coastal talukas of Devgad, Malvan and Vengurla. Work in 134 of these villages located in Devgad and Malvan talukas will be carried out by The Energy and Resources Institute (TERI) and the remaining 51 villages in Vengurla taluka by the Lupin Human Welfare and Research Foundation. Forest officials in Sindhudurg informed that a memorandum of understanding (MoU) between the voluntary organizations and forest department is likely to be signed in early February and visits for consultations to each village will start soon after. The project cost is around Rs 40 lakh.

Anjali Parasnis, associate director (western region) for TERI, confirmed the institute’s participation in the project but refused to divulge details since the MoU is yet to be signed. Nair said the voluntary organizations would conduct extensive consultations with elected leaders of the gram panchayats and gram sabhas, fisher people’s co-operatives, farmers’ organisations and other institutionalised bodies before drafting the village-level biodiversity action plans. "This process should take about three to four months."

NGOs working in Konkan welcome the move. Bhau Katdare of the Sahyadri Nisarg Mitra, working to protect turtles, said it is good if biodiversity action plans are drafted after consulting local communities. “Sitting in Mumbai and Delhi, it is not possible to equal the knowledge of the conditions and requirements of local communities in Sindhudurg. So involving them in such processes is always good. However, it all depends on how the process is implemented on ground for it to succeed,” said Katdare.

Mangrove cell lines up projects to boost marine ecosystem off Sindhudurg coast

ANJALI LUKOSE

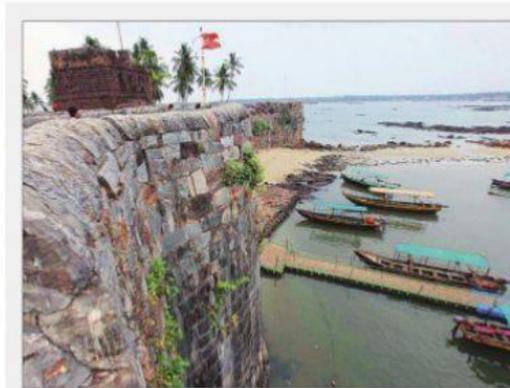
MUMBAI, DECEMBER 26

FROM the first week of the New Year, the marine ecosystem off the Sindhudurg coast district will witness a slew of eco-friendly projects, such as those on crab farming, profiling and mapping of coral reefs, studies on whale sharks and dolphins, and introduction of devices, which will promote sustainable fishing in the area. These projects were commissioned by the mangrove cell of the Maharashtra forest department last month as part of the GOI-UNDP-GEF project.

Three talukas — Vengurla, Malvan and Deogad — in Sindhudurg district have been selected for the project, of which N Vasudevan, Chief Conservator of Forests, Mangrove Cell, is the nodal officer.

According to the forest department, the Sindhudurg Coastal and Marine Ecosystem, one of the 11 ecologically and economically critical habitats identified along the Indian coast, boasts of at least 376 species of mega marine fauna.

The cell has commissioned the Zoological Survey of India to conduct a comprehensive profiling and mapping of coral reefs and associated fauna through SONAR, satellite imagery and diving off the Sindhudurg stretch. The National Institute Of Oceanography, Goa, has been commissioned to conduct a biological study of the Angria bank, located about 100 km off the Malvan shore. The bank, spread across about 600 sq km at the very edge of the conti-



FOR A PLASTIC-FREE SINDHUDURG FORT

IN ANOTHER conservation effort, the Sindhudurg fort will soon become plastic-free with the mangrove cell's decision to distribute around 100 jute bags for tourists to keep their plastic waste in. The jute bags, orders of which have been placed, will be given to tourists for a fee, which will be returned when they deposit the bag along with the plastic waste after their visit. The cell will rope in gram panchayats from the three surrounding villages to begin clean-up activities, maintain garbage bins and possibly start a small-scale solid waste management plant.

ental shelf off India's west coast, sees rich growth of corals and congregation of rare fish species like whale sharks, the world's largest fish.

The forest department also plans to undertake coral transplantation and regeneration activities along this stretch and plans to rope in the Central Marine Fisheries Research Institute for marine ornamental fish culture.

In January, crablet seedlings will be released as part of the crab farming activity conducted by Rajiv Gandhi Centre for Aquaculture, Tamil Nadu. "The forest department alone cannot handle conservation of mangroves and biodiversity in Sindhudurg. These projects by the mangrove cell are an attempt at mainstream-

ing coastal marine biodiversity into the production sector and bring the conservation ethos into it. Around 185 coastal villages were affected by CRZ. Our projects will benefit 50 villages in the first phase," said Vasudevan.

Meanwhile, to encourage sustainable fishing, Central Institute of Fisheries Technology, Kerala, will introduce fishermen to specialised devices that will aid in excluding juveniles and reducing by-catch. The project will include testing and modifying these devices to suit the needs of the fishermen with active participation of the fishing community.

"We are trying to create an organic link between environment protection and local

livelihood. We will also help locals set up homestay units for tourists coming to see the Olive Ridley turtle nesting sites. This would serve as an incentive for the locals to also protect the sites as it is an alternative source of income for them," said Praveen Pardeshi, Principal Secretary (Forests).

The College of Fisheries, Ratnagiri, will complement this project by conducting workshops on awareness programmes for sustainability of fishing and collecting information on current practices for 30 fishing cooperative societies.

The forest department has also appointed a fisheries consultant, Centre for Environment and Development, Kerala, to look into all aspects of sustainable fishing practices and provide a comprehensive fishing plan for the region. The report is expected in January, according to an official.

The mangrove cell has also commissioned a Goa-based NGO to increase the yield of rice in these districts through a technique called System of Rice Intensification.

These projects were distributed among different coastal villages based on The Energy and Resources Institute's (TERI) participatory rural appraisal of 134 villages. The study assessed biodiversity resources of the villages and studied the impact of locals' lifestyle on the ecosystem. "The TERI report helped us identify what activities would benefit which villages. All future programmes of biodiversity conservation in this region will be based on this report," said Vasudevan.





The Hindu

May 11, 2014

Call for beach nourishment to arrest soil erosion

SPECIAL CORRESPONDENT
VISAKHAPATNAM, MAY 11, 2014 11:01 IST

Globally, there are about eight million species, of which more than two million live in the ocean. With the abundance of marine life forms, the dependence on marine resources has increased in the last few decades and this emphasises the need for effective planning and management of the coastal and marine resources, said Inspector General of Forests, Ministry of Environment and Forests, S.K. Khanduri. He was speaking at a two-day international consultative workshop on 'Across Landscapes: Conserving Coastal and Marine Biodiversity' jointly organised by MoEF, United Nations Development Programme (UNDP) and Global Environment Facility (GEF) here on Saturday.

According to Dr. Khanduri, the country is not only endowed with a long coastline of 7,500 km, but has an exclusive economic zone of 2.02 million sq km and 4,68,000 sq km of continental shelf. "The ecosystem and biodiversity is rich and varied and this workshop was organised to discuss with all stakeholders various aspects such as marine protected area management initiatives, governance and inter-sectoral coordination, blue carbon - resource and conservation and creating win-win strategies for sustainable growth and resource management."

In a special presentation Probir Kumar Banerjee of Pandy Can, citizen's action network, said focus should be given to beach nourishment to arrest soil erosion. According to him, about 30 per cent of the total country's population live along the coast, and if soil erosion was not arrested, then saline water would enter the fresh groundwater resources and it would affect not only human beings but also agriculture and the ecosystem.

The workshop was attended by a number of high ranking officials from MoEF and UNDP.



THE TIMES OF INDIA

The Times of India

May 11, 2014

Strike a balance between conservation, development, forest official says

TNN | May 11, 2014

VISAKHAPATNAM: Environmental protection and development are not mutually exclusive and can go hand-in-hand as long as there are enough safeguards that are put in place, said Dr SK Khanduri, inspector general of forests, Union ministry of environment and forests, said here on Saturday while speaking at a two-day UNDP seminar on coastal and marine biodiversity.

"The ecosystem can be conserved despite development projects. Where conservation can be brought into effect in a full-fledged manner, it will be and where damage can be mitigated, the agencies will do their best to do so. We need to understand and take steps to mitigate the damage factor," he said, pointing out that the focus should be on bringing more stake holders into play, educating them and ensuring that development does not spill over to entirely ruin an ecosystem.

Talking about marine and coastal ecosystems, Dr Khanduri said these ecosystems cannot be demarked as they are fluid with no fixed demarcation. "In such systems, there will be a lot of internal conflict between various stake holders, like the conflict of interest between fisherfolk, who depend on the sea for their livelihood, and bigger fishing companies who fish in deep waters. Our agenda is to bring them all on to a common platform to ensure that there is a civilised debate with the help of which people can work together," he explained.

On the issue of green credits, Dr Khanduri said that a holistic calculation mechanism is yet to be brought into place and that one of the main reasons for the difference in opinion is the fact that biodiversity differs from region to region, with no uniform code in place. While pointing out that the concept was yet to catch on in India, he said that countries like India had made it clear that the painstaking efforts that go into making of a green landscape must also be considered when credits are given.

When asked if the coastal corridor project would cause a great deal of damage to the local ecosystem, Khanduri said: "Such a project would not get the approval of the MOEF if it were so anti-nature and anti-biodiversity. Checks and balances have been put in place to ensure that certain rules are followed expressly."

However, Dr Khanduri admitted that a full-fledged report on the impact of giving pattas to native residents of forests was yet to be received.



The Pioneer

July 3, 2014

PURI FARMERS FIND RAY OF HOPE IN FLOATING GARDEN

Thursday, 03 July 2014 | HEMANTA KUMAR PRADHAN | BHUBANESWAR

After vegetables grown in abandoned wetlands successfully

Farmers of Satyabadi block in Puri district, whose hundreds of acres of land are covered with waste water round the year, have a reason to cheer with successful implementation of a pilot project that allows them to again raise crops on the land in an innovative way.

Before the project, the farmers had lost hope on their land covered with waste water. They had left farming due to the water-logging problem. But the members of the United Nations Development Programme (UNDP), the Regional Centre for Development Cooperation (RCDC) and the Society for Women Action Development (SWAD) told the farmers that they could use the water clad land by raising floating gardens.

According to the process of making a floating garden, the farmers first make rectangular plots with bamboo sticks. After making plots (20 ft length, five ft width and 1 ft height) intertwined with bamboo sticks, the farmers cover the wooden plot with water hyacinths and leave it dry. Then the hyacinths are covered with a layer of soil mixed with compost to make it ready for farming.

This year, farmers sowed seeds of green leaves, coriander, panmahuri, chili, tomato and other vegetables and have yielded good amount of vegetables. "I got vegetables sufficiently for 15 days and also sold some of these in the market," said a woman farmer Sumi Baral, adding, "I'm not calculating loss and profit out of the vegetable produce, but I'm happy that I am able to use the waste land and raise crop on it."

SWAD member and a farmer, Swadhin Pradhan said the vegetation on the bamboo plot from a distance seems like a garden floating on the water. The bamboo plot is tied to a log so that it cannot change its location, he added.

Now, Sumi is more confident about her crop. She would create more bamboo plots to sow seeds on it. Floating garden concept has brought a new ray of hope for the farmers of waterlogged areas, said RCDC manager Barsha Mishra.



The Hindu

December 18, 2014

Managing coastal resources

R. Sivaraman

IFS officers discuss innovative strategies at workshop



The workshop was designed to provide holistic view of the management of marine biodiversity.— Photo: T. Singaravelou

Indian Forest Service (IFS) Officers of the coastal States discussed innovative strategies to tackle the impact of climate change on coastal and marine areas at a workshop here on Wednesday.

Indira Gandhi National Forest Academy (IGNFA), Dehradun, is implementing the United Nations Development Programme (UNDP) project which aims building capacity of IFS officers working in coastal areas. The workshop was organised as part of this project.

The workshop is designed to provide holistic view of the management of coastal and marine biodiversity through classroom discussions, field visits, sharing of experience and documentation of good practices followed in various States. Thereby, the participants gain knowledge and skill to manage the coastal resources efficiently.

The coastal zones represent diverse eco-systems and support highly productive habitat such as mangroves , mudflats and other marine species. India has a coastline of 7,500 km which is intersected by rocky outcrops and shores with stretches of sandy beaches. It supports over 25 per cent of population in the country within 100 km of the coastline.

A concept note from the workshop said the coastal zones are being subjected to enormous pressure owing to anthropogenic and socio-economic factors. Besides that, erosion and accretion, inundation due to rise in sea level , shifting of shoreline caused by natural forces and man-made constructions also affects biodiversity.

The note also said that efficient management of coastal and marine areas is essential to safeguard the well-being of people who are depending on these resources and associated biodiversity. The Forest Department, being the custodian of wildlife in the coastal and marine areas and implementing agency for coastal regulation zone provision in various States, should strengthen its capacity to manage these resources effectively.

Speaking at the workshop, Chief Minister N. Rangasamy said, "The importance of mangrove forests and coastal plantations in minimising sea erosion is a well-known fact. Therefore, sustainability of these fragile eco-systems should be our primary concern."

Dwelling on coastal ecosystems and climate change issues, S. Senthil Kumar, associate professor of IGNFA, mooted innovative means for coastal restoration and monitoring such mangrove engineering, reef restoration and sea grass restoration.

He said, "Reef restoration is essential to capture more carbon dioxide which is present in the atmosphere. All the States should plant more reefs to mitigate damage caused by climate change."

The Fish Site

The Fish Site

May 11, 2015

MPEDAs Maharashtra Crab Farming Project a Success

Jagdish Kumar
11 May 2015

INDIA - The Marine Products Export Development Authority (MPEDA)s crab farming pilot project in Sindhudurg district, Maharashtra state, has been a successful, a source told TheFishSite.com

Speaking on the project, the source said that the project that was started in October 2014 after a successful trial with the involvement of six farmer help groups from three places that include Malvan, Vengurle and Devgad situated along the Konkan coast in Maharashtra.

Under the project, Mangrove crabs, also known as mud crabs (*Scylla serrata*), are farmed in the one acre line that has been provided to farmers from MPEDA. Before the line was given, these farmers were trained by MPEDA scientists on crab farming, the source said.

The crabs are grown at a farm that is located in the mangroves and covered by high density polythine nets (HDPN), which were also provided by MPEDA.

As the crab is grown in the natural environment, there is no capital cost involved, the source stressed.

Each self-help group has been given two lines of 1 acre each. For an acre, 2000 seeds have been used, meaning a total of 4000 for the farm they operate.

The project is funded by the Maharashtra State Forest Department that has pumped over \$240,000 (Rs 1.5 crore) into the project.

The crab seeds are provided to farmers for a mere \$0.03 (Rs 2) per piece and will fetch farmers \$16 (Rs 1000) per crab after nine months of harvesting.

Seeds are given to farmers from MPEDA's hatchery in Tamil Nadu on a subsidised rate. Mud crab seed production is by the Rajiv Gandhi Centre for Aquaculture (RGCA), MPEDA in Tamil Nadu.

The season for crab farming in the mangrove region is from September to May and there is huge demand for mud crab in international markets.

Speaking on the project, the source said that if the pilot project is successful we will set up 15 new farms with the help of self-help groups starting from September 2015.

The project will cost over \$1 million, however, the source did not reveal who will fund the project, but it is expected that the forest ministry will be funding it.

As the project uses natural mangroves for crab farming, no capital cost is involved, only the cost for nets and crab feeds. Crab feed can be fish that cannot be sold in the market, cut in pieces.

The source said, there is presently, no organised aquaculture of mud crab in India, for supporting the export trade.

The major reason being the non-availability/inconsistent availability of crab seeds for farming. Hence, only crab fattening is being practiced by the coastal farmers/fishermen, where soft crabs/water crabs (moulted crabs) caught in the wild are reared in brackish water tide fed ponds/pens in estuaries until they are hard and ready for marketing.

Besides exploitation, natural stocks are also dwindling owing to habitat loss due to several reasons including fast urbanization in the coastal belts.

When asked whether mud crab farming can be possible near Mumbai, which is surrounded by sea, the source said that water quality needs to be checked as it is often read in newspapers that sewage waters are discharged into the sea, so that will not work, but in Sindhudurg it has worked.

Rajiv Gandhi Centre for Aquaculture (RGCA), the research & development (R&D) arm of the MPEDA, located at Thoduvaai, Sirkali in Nagapattinam District, Tamil Nadu has taken up R&D work on the production of mud crab seeds in the hatchery and has established a hatchery at Thoduvaai Village, Sirkali, Nagapattinam, Tamil Nadu, the source added.

This hatchery is one among very few mud crab hatcheries in the world. The Philippines, Vietnam and China being the other countries having them.

This hatchery has been regularly producing mud crab seeds reared to crablet sizes at its demonstration farm and supplying to farmers in the area.

Crablets have also been supplied to several research institutions like the Central Institute of Brackish Water Aquaculture (CIBA) and the National Institute of Ocean Technology (NIOT) for their farming demonstrations.

The facility has also been carrying out ranching of crablets in estuarine and mangrove areas in Tamil Nadu from time to time for natural stock enhancement.

Owing to the highly cannibalistic nature of the larvae of this species, larval rearing of mud crabs is a very challenging task and survival rates achieved are extremely low when compared to other crustacean species and species of finfish.

But, scientists at RGCA have achieved a breakthrough survival of seven to 14 per cent against the world average survival rate of three per cent.

This encouraging breakthrough achieved by RGCA can open up avenues for commercialisation of mud crab hatchery technology leading to organised mud crab aquaculture in the coastal areas of the country especially among the weaker sections of the society giving them an alternate livelihood option and also to strengthen the production base of mud crab for export in live and value added products, the source said.

This can also result in reducing the fishing pressure on the natural stocks and thereby facilitating natural stock enhancement in the mangrove forests.

Maharashtra: Blue whales spotted off Sindhudurg coast after 100yrs

A mother-calf pair of blue whales, the largest mammals in the world, was spotted after nearly 100 years in Maharashtra by a group of researchers, 3km away from the Sindhudurg coast between March and May.

MUMBAI Updated: May 21, 2015 13:35 IST
Badri Chatterjee

A mother-calf pair of blue whales, the largest mammals in the world, was spotted after nearly 100 years in Maharashtra by a group of researchers, 3km away from the Sindhudurg coast between March and May. Researchers also spotted four Bryde's whales during the same period.

These sightings were reported by the Cetacean Population Study team, deployed along the Sindhudurg coast for the past six months under the United Nations Development Programme (UNDP) project on Mainstreaming Coastal and Marine Biodiversity and implemented by the Maharashtra state mangrove cell.

“The blue whale sighting was that of a mother-calf pair. They were seen near Kunkeshwar, 2.7km offshore at a depth of 16m,” said Ketki Jog, member, Cetacean Population Study team.

N Vasudevan, chief conservator of the forest, mangrove cell said, “The last sighting of the blue whale recorded off the coast of Maharashtra was in 1914. According to the records of the Central Marine Fisheries Research Institute (CMFRI) – a dead blue whale had washed ashore at the time. In the recent past, another sighting of the mammal was observed in 2010 along the coast of Mangalore.”



Blue whale off the coast of Sindhudurg.

“The sighting of the largest mammal just 3km away from the Sindhudurg shore calls for immediate study as to why such a large species is moving close to land,” added Vasudevan.

The mangrove cell head also said regular whale watching activities are going to be initiated across the Sindhudurg coast. “Without disturbing the habitat of the whales, these spots can become a tourist attraction if such mammals are spotted often,” he said.

According to CMFRI researchers, the mammal is found across the Indian Ocean, southern parts of the Sri Lankan coast and quite often they have been found to migrate to parts of Bay of Bengal and the Arabian Sea.



Calf of the blue whale off the coast of Sindhudurg

E Vivekanandan, consultant and scientist, CMFRI, Chennai, said, “Mammals like the blue whale often frequent the coasts of India. However, the issue is that there has been no documentation of the same. Authorities should invest more such studies to protect the endangered species.”

Jog said a small pod of four Bryde’s whales were also spotted, one of which was a mother-calf pair. “They were first observed around 600m from the coast at an average water depth of 15m,” she said.

Under the UNDP project, the Cetacean Population Study team also sighted 687 dolphins, of which 153 individual dolphins were identified because of distinct features such as their fin. Sightings of close to 40 Finless Porpoise were also recorded across the Sindhudurg coast during the two phases of the study this year.

(Photo credits: The Konkan Cetacean Research Team)

Blue whale returns to Maharashtra waters, its cousin keeps showing up

ANJALI LUKOSE
MUMBAI, MAY 20

A "BIG SHAPE" and a "blow" greeted marine biologists on a boat off the Sindhudurg coast two weeks ago. In search of dolphins for a study on behalf of the Indian government and United Nations Development Programme, the team spotted Bryde's whales just 600 metres off the coast. And it was not the first time.

On March 28, the team had sighted a bigger surprise, a pair of blue whales, near Kunkeshwar, 2.7 km offshore at a depth of 16 metres. Since then, they have spotted members of a pod of four Bryde's whales four times — April 11, 16, 30 and May 6, near Achra, Tarkarli, Talashil and Sarjekot, at a



A Bryde's whale, one of a pod spotted four times, and (right) a blue whale, one of two spotted once.

depth of 15 m.

The blue whale, the world's largest animal, has in particular got the research team excited as the last reported sighting was in

1914, one that washed up on the Maharashtra coast, according to N Vasudevan, Maharashtra's chief conservator of forest, mangrove cell.

"Our boatmen suddenly saw a big shape emerge," Ketki Jog, a member of the Konkan Cetacean Research Team, said from a trawler. "No sooner had we seen the whale than we

spotted the calf and followed them for a while. We took lots of photos and left them alone as the presence of the mother meant 'don't disturb'."

The research team includes Mihir Sule, Isha Bopardikar, Dipani Sutaria and Vardhan Patankar, besides Jog. It has been surveying the waters from Vijaydurg to Redi, near the Goa coast, since May last year, up to 2.25 km offshore for Indo-Pacific humpback dolphins.

Blue whales tend to be open-ocean species, but they do come close to the shores to feed and are either resident or migratory, said Sule, adding that Bryde's whales are the most common species of baleen whales along the Indian coast and can go up to 15 metres long.

"Fewer than 10,000 blue whales, by one estimate, are on this planet and a live sighting — that too a mother and calf — is rare. We need to do further research to understand whether it is climate change or other changes in the sea that are causing these whales to come so close to the shore," said Vasudevan.



Blue whales spotted off Sindhudurg coast after 100 yrs

[Press Trust of India](#) | Mumbai
Last Updated at May 22, 2015

Researchers have spotted a pair of blue whales along Sindhudurg coast in Maharashtra, the first such sighting along the state coastline in a century.

It was a pair of mother-calf blue whales, N Vasudevan, Chief Conservator of Forest (Mangrove Cell) told PTI.

This is the first time in over 100 years that whales have been spotted along Maharashtra coast, he said.

The last such spotting recorded was in 1914, Vasudevan said.

The whales were spotted recently by a group of researchers, 3 kms from the Sindhudurg coast between March and May. The researchers also spotted four Bryde's whales during the period.

The sightings were reported by the Cetacean Population Study team, deployed along the Sindhudurg coast for the past six months under the United Nations Development Programme (UNDP) project on Mainstreaming Coastal and Marine Biodiversity and implemented by the Maharashtra State Mangrove Cell.

Under the UNDP project, the Cetacean Population Study team also sighted 687 dolphins, of which 153 individual dolphins were identified because of distinct features such as their fins.



Centre ties up with UNDP to hold whale shark workshop

TANEA BANDYOPADHYAY | Updated: May 25, 2015, 06:39 AM IST, DNA

The Government of India – United Nation's Development Program Global Environment Facility (GoI UNDP GEF) project will be organising a whale shark workshop on May 30. The workshop will focus on mainstreaming marine and coastal biodiversity in Sindhudurg.

The Whale Shark is the biggest fish in the world and is known as the 'gentle giant of the waters' due to its docile nature.

N Vasudevan, chief conservator of forests, mangrove cell, Mumbai, said: "We realised that there needed to be some policy created within the state to better protect these fish. Unlike Gujarat, where there were incidents of targeted hunting of the whale shark, in Maharashtra, every catch has been incidental."

A report by the Wildlife Trust of India states that Maharashtra has the second highest number of Whale Sharks in India. However, it is hunted in many parts of Asia for its fins, which are considered a delicacy in China.

It was included in the Schedule 1 of the Indian Wildlife (Protection) Act, 1972 on May 2001, which is the highest level of protection given to animals. At the international level, it is included in Appendix II of the Convention in International Trade in Endangered Species of Fauna and Flora (CITES).

Vasudevan added: "Unfortunately, mostly terrestrial animals of the Schedule 1 of the Wildlife (Protection) Act, are considered when making awareness campaigns like those about the tiger. However, in the case of marine creatures, the circumstance is trickier since the awareness has to be created among fisher folk who depend on the sea for their livelihood, and all complications of the marine environment are not apparent."

The workshop will have officials from various government and non-government agencies like Vasudevan and Mr Sarjan Bhagat, principal chief conservator of forests, chief wildlife warden; Dr SK Khanduri, inspector general of forests (wildlife); Dr Venkatraman, director, zoological survey of India.



The Hindu

May 29, 2015

Maharashtra to protect whale sharks

Alok Deshpande

Wildlife Trust of India has estimated that the second largest group of whale sharks can be found in Maharashtra.

Maharashtra will soon have a policy to protect the whale sharks in the waters off its coast. Taking a cue from the efforts put in by neighbouring Gujarat, the state is chalking out a plan to conserve the largest fish in the world.

As a part of these efforts, the Central government, United Nations Development Project (UNDP) and Global Environment Facility (GEF) have organised a one-day workshop for various government bodies, non-government organisations and field experts on May 30. The International Union for Conservation of Nature (IUCN) is also one of the partners in the workshop. “The workshop has been organised with an aim to formulate a workable roadmap that will be implemented on ground,” said N. Vasudevan, Chief Conservator of Forests, Mangroves Cell.

Whale sharks come under Schedule 1 of the Indian Wildlife (Protection) Act, 1972, which means that the fish should be given highest priority in terms of protection. The Wildlife Trust of India has estimated that the second largest group of whale sharks can be found in the sea waters off Maharashtra.

According to Mr. Vasudevan, forming a policy to protect fish species from being hunted will involve interacting with fishing communities.

WITHOUT RESEARCH, DOLPHIN DEATHS CONTINUE TO PUZZLE MARINE BIOLOGISTS, EXPERTS

Mumbai Mirror | Jun 1, 2015, 09:37 AM IST | By Gitanjali Das

The frequent instances of dead dolphins washing ashore could be due to manmade causes rather than natural ones, say marine biologists studying the ecological impact of the city on coastal marine life.

Between April 21 and May 26 alone, carcasses of five humpback dolphins, a finless porpoise and a sea turtle were found at Marine Drive, Nariman Point, Versova and Prabhadevi beaches.

Experts say the reasons could range from 'ghost nets' (fishing nets abandoned after they get snagged on rocks underwater) and excessive fishing to rise in boat traffic, offshore oil exploration, sewage and effluents released into the sea illegally.

However, without a detailed postmortem of the carcasses before they decompose, they point out that affixing manmade reasons to their deaths is difficult, as in the case of the dolphin carcass that civic workers disposed of at the Deonar dumping grounds recently. The postmortem could reveal a mobillivirus infection that can be passed on from mother to calves and affects vital organs, or parasites that cause brain cysts. Only after ruling natural causes out can manmade reasons like pollution be probed, says wildlife veterinarian Dr Dr Yuvraj Kaginkar.

Mirror accessed four such postmortem reports, but none mentioned the exact cause of death. "We have sent the reports to the state pollution control board and the Kalina forensic laboratory, but a response will take around two months," said Anil Toradmal, range forest officer, Mumbai Range.

The lack of a dolphin census, or even a rough estimate of their numbers, adds to the challenge. The Konkan Cetacean Research Team (KCRT) researching marine life in Sindhudurg said their members have sighted around 674 dolphins and identified 150.

The KCRT is working on the UNDPbacked Sindhudurg Cetacean Project, which includes looking at abundance estimates of the IndoPacific humpback dolphins. "Till we don't know how many dolphins exist in our coastal waters, even one death is something to worry about," said KCRT member Mihir Sule.

N Vasudevan, chief conservator of forests (Mangrove Cell), recently wrote to the BMC commissioner requesting that marine animal deaths be reported to the forest department in a timely manner to facilitate postmortems before they decompose.

"This will enable us to determine the exact cause of death, whether it is natural or not. We need more research on marine life in India to establish if our activities are harming their ecosystem. Without a census, we don't know if the dolphin population has increased or decreased," he said.

"Fishermen usually don't consume or sell dolphins, so the ones that end up in their nets are returned to the water, even if injured. We need is a helpline so vets can treat injured marine animals," said Sarang Kulkarni, an independent marine biologist.

According to marine biologist Nitin Walmiki, slash marks on the carcass could mean the dolphin was hit by a ship's propeller. "Unless a detailed autopsy is done before the carcass decomposes, we cannot establish this," he said, adding the humpback dolphin is protected under Schedule 2 of the Wildlife Protection Act and killing it could mean jail time and fines as this comes under the Act's 'hunting' section.

Rs 6,000 investment and 15 months later, 10 women reap rich dividends from oysters

ANJALI LUKOSE
MUMBAI, JUNE 29

TEN WOMEN spent three days erecting bamboo frames with old, empty oyster shells in Wadatar creek in Sindhudurg in March last year.

Fifteen months later, the women made Rs 50,000 by harvesting 125 kg meat from 6,000 oysters. These women are among the first oyster farmers in the state.

"We no longer have to go looking for oysters in marshy areas of the creek and depend on luck. We can grow oysters and earn well with less effort. We are definitely planning to expand in our village and have also spread the news to other villagers," said Kasturi Dhoke, 40, one of the farmers.

While the partial harvest last week yielded 125 kg meat, the estimated production from a single raft of 150 sq m is 187 kg in 15 months. This is part of a project by the United Nations



Kasturi Dhoke looks at oyster spat forming under shells left on bamboo frames. *Express*

Development Programme and Government of Maharashtra to create sustainable livelihoods in coastal communities.

Central Marine Fisheries Research Institute, Kochi (CMFRI), and Marine Product Export Development Authority (MPEDA) introduced these uneducated but skilled women to

oyster farming. The project, which started with an initial investment of Rs 6,000 for bamboo, material and labour in March 2014, yielded eightfold returns.

After the success of the pilot project, the UNDP Sindhudurg project will now take oyster farming to coastal

families in the three coastal talukas of Sindhudurg district — Devgad, Malvan and Vengurla. Further, as depurated oysters will provide four to five times profit, a Depuration Unit (meant for clearing the gut content of oysters) can be set up in the vicinity, said Dr P K Asokan from CMFRI.

The technology is simple, said Subir Ghosh, project coordinator of the UNDP Sindhudurg project. A raft using 450 ropes was set up with substrates or empty oyster shells on each bamboo frame. Naturally available oyster spat in the Wadatar creek adhered to these suspended substrates over time. Oyster farming is one of the cheapest and most environmentally-friendly options for sustainable livelihood in coastal areas, said forest officials.

"It is a win win situation for us," said N Vasudevan, chief conservator of forests, mangrove cell. "This method needs no additional feed that is required for farming oysters. The naturally available oyster spat in the Wadatar creek adhere to these suspended substrates over time. Moreover, oysters being filter feeders, grow on plankton and detritus filtered from the creek water and essentially clean the environment they grow in. Plus, oyster meat generates more income than molluscs and mussels," he said.



Seafood companies see big bucks in mangrove crab exports

By P K Krishnakumar, ET Bureau

KOCHI: Identifying live crab exports as a potential money spinner, the Indian seafood industry is all set to rear mangrove crabs, so as to scale up the export of the crustacean that commands high price in the global market, particularly in Southeast Asia. The Marine Products Export Development Authority (MPEDA) has begun farming of crabs in the mangroves of Sindhudurg district in Maharashtra through coastal fishermen.

The UNDP-funded project, with the help of the forest department, has two objectives - to provide a sustainable livelihood for the fishermen and to protect the mangroves. It has identified 15 locations and work has begun in Devgud, Malvan and Vengurla taluks. "About 90 per cent of the life cycle of a crab happens in mangroves. So, they can be reared in ideal conditions. Green mangrove crab is a much sought-after variety and fetches a price of Rs 1,000 to Rs 1,400 a kg in the world market," said P Anilkumar, deputy director at MPEDA.

At present, mud crabs are reared in farms or ponds in states like Andhra Pradesh and Kerala. The seeds are supplied by the Rajiv Gandhi Centre for Aquaculture in Tamil Nadu, the R&D wing of MPEDA, which achieved a breakthrough in crab hatchery technology with one of the highest survival rates in the world. The seeds are farmed by the self help groups of local fishermen and then supplied to the exporters once it reaches full size in around ten months. Live crab exports, mostly done by air from Chennai and Mumbai, are at present pegged around Rs 220 crore annually and has grown only marginally over the past few years.

Once the mangrove rearing becomes widespread, MPEDA hopes to increase it several times. To ensure steady supply of seeds, the agency is in the process of setting up another hatchery in Maharashtra. The crab exports have not picked up in a big way in Maharashtra and Gujarat. "Unlike in Chennai, there aren't many exporters in Mumbai who can share the cost of booking and sending the consignment by air.

The airport insists on exporting a minimum of one container that will involve more cost for us. The government should allow us to send consignments of smaller lots as it will be difficult to source crabs during the off season," said Subhash Sutar, live crab exporter in Mumbai. Since it takes 10 months to rear the mangrove crabs, MPEDA is also planning to allow the fishermen to cultivate softshell crabs in the mean time.

Sindhudurg's mangrove cover increasing, reveals study

A study by the Maharashtra Remote Sensing Application Centre (MRSAC) based on satellite images has revealed 3,300 hectares of mangrove in the coastal district as against 2,000 hectares recorded in 2005.

MUMBAI Updated: Aug 08, 2015 21:24 IST
Badri Chatterjee
Hindustan Times



Even as mangroves in Mumbai continue to be destroyed, a different story has panned out in Sindhudurg. A study by the Maharashtra Remote Sensing Application Centre (MRSAC) based on

satellite images has revealed 3,300 hectares of mangrove in the coastal district as against 2,000 hectares recorded in 2005.

More than 1,070 hectares have been notified as dense mangrove areas, while 349 hectares are sparse, said Dilip M Kolte, senior resources scientist, MRSAC. Around 20 mangrove species have been recorded and 19 species are being raised in nurseries.

“The area in Sindhudurg is conducive for natural regeneration of plants, which could be a major factor determining the increase in mangrove cover,” said Arvind Untawale, retired marine biologist and executive secretary, Mangrove Society of India.

“The marine biodiversity around Sindhudurg should be exposed to the public for education, recreation and most importantly, conservation,” said Untawale.

Mapping the district’s mangrove cover is among the 30 of a four-year-long biodiversity conservation project. The mid-term report was completed last month.

“Through a series of intervention in the fisheries, agriculture and tourism sector, the project has been able to bring about mainstreaming marine biodiversity into these production sectors,” said N Vasudevan, chief conservator of forests, state mangrove cell.

The preliminary findings of the report come at a time when the state government’s proposal to promote Sindhudurg as a coastal tourism circuit received the Centre’s approval, and could offer tourists houseboats, floating cottages, glass-bottomed boats and resorts in royal palaces.

HT had reported on May 23 that a pair of [blue whales](#) (mother and calf) was spotted 2.7km off the shore from Sindhudurg by the Konkan Cetacean Research (KCR) team that was conducting one of the projects.

“This is a first-of-a-kind study done at this location where we identified 308 individuals of Indo-Pacific humpbacked dolphins and close to 40 individuals of finless porpoise till the mid-term,” said Ketki Jog, member, KCR.

In addition, more than 200 bird species, five threatened species, two endemic species, 77 wetland dependent species, about 20,000 gulls and 11 nests of white-bellied sea eagles were recorded as part of the bird population study.

27 nesting sites in place

The project titled ‘Mainstreaming Coastal and Marine Biodiversity Conservation into Production Sectors in the Sindhudurg Coast, Maharashtra’ is part of the Government of India – United Nations Development Program – Global Environment Facility and implemented by the state mangrove cell.

As part of the turtle conservation project, mostly of Olive Ridley turtles, along the Sindhudurg coast, close to 13 new nesting sites have been located where hatchlings have been released into the sea. A total of 27 nesting sites are now in place.

Threats faced

- * Habitat loss
- * Ensnalement in fishing nets
- * Denudation of beach fronts because of development activities

India's Great Barrier Reef?

An NIO expedition has unearthed rich, diverse marine life beneath Angria Bank off Maharashtra coast

ANJALI LUKOSE

Humongous barrel and staghorn corals, multi-coloured swarm of groupers and ray fish gliding away, and seamounts teeming with marine life – this is how divers describe the sights in Angria Bank.

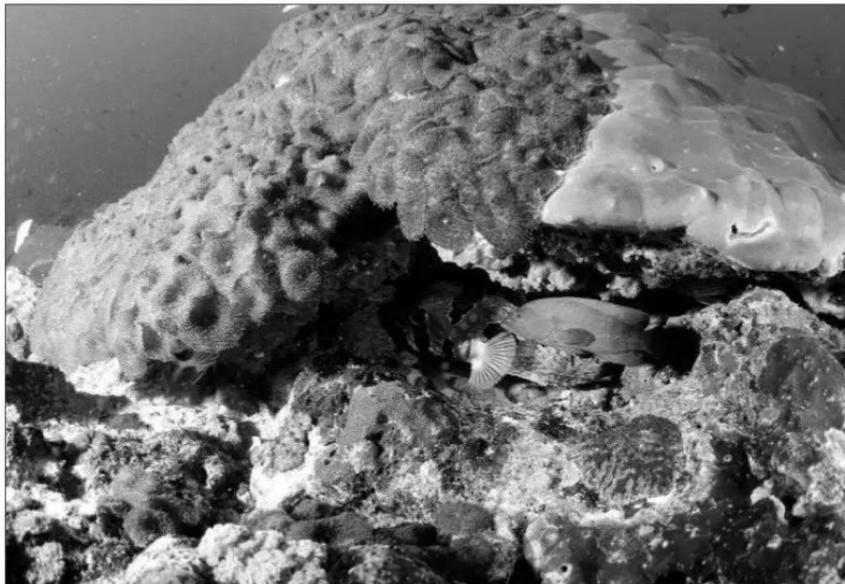
Situated 140 km off the Malvan coast of Maharashtra, the 600 sq km plateau is a submerged reef with "rich coral diversity unlike the shallow reefs around Andaman and Lakshadweep islands", the interim report on one of the first expeditions in Angria Bank by the National Institute of Oceanography (NIO) has found. "Angria Bank has the potential to become India's Great Barrier Reef," says Baban Ingole, Chief Scientist, NIO.

During the expedition, the divers found corals in 10 out of the 15 dive sites in the area. According to the report by the NIO, "these sites have diverse marine flora and fauna and the terrain in most of the rocky areas was found to be coralline, made of calcareous materials with no mud". The findings suggest that Angria Bank could have "rich coral reef history", says the report.

The expedition was conducted in 2014 as part of the Government of India-United Nation Development Programme's Global Environment Facility Sindhudurg Project.

The Angria Bank has ample presence of cetacean fauna – represented by whales and dolphins, and multiple varieties of fish including big angel, anemone, groupers, snappers, barracudas, glass fish, flying fish, leopard eels and scorpion fish, among others, the NIO report states.

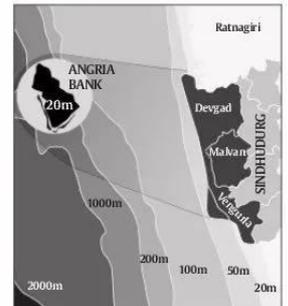
Even non-academic divers, who have previously explored coral sites in Andaman & Nicobar Islands and Thailand, found sediments and rock corals at Angria Bank "different". "We were surprised how abundant and healthy marine life in this region was. The seamounts and the teeming life around it were breathtaking," says Tariq Khan, who was one of the divers in the expedition.



"Such a high diversity of corals was new for us. This coral reef is not off the islands like in Lakshadweep or Andamans, it is in open sea and submerged. We now want to explore the relationship of the corals here to the corals found in the other coral banks in India," says Ingole.

The findings have also opened up avenues for fresh research. "Probably, there are new species in this virgin territory, especially invertebrates, but we can only confirm this after extensive research and analysis," adds Ingole.

"Angria bank is even more interesting be-



cause of its proximity to Mumbai and the Maharashtra coast that is well-connected, unlike its counterparts in Lakshadweep or Andaman," points out N Vasudevan, chief conservator of forests of the mangrove cell.

In fact, the Forest Department's mangrove cell and the NIO are planning a second expedition in October, when they hope to send remote-operated vehicles to explore deeper parts of the Angria Bank.

The expedition will also explore the threats to Angria Bank from fishing trawlers and unchecked offloading of pollutants by big ships.

"We want the region to be a designated area for conservation under the Maritime Zones Act, as the Angria Bank falls outside the territorial waters but inside the Exclusive Economic Zone of India," explains Vasudevan, even pitching for "regulated tourism" in the area.

Once it is protected, the Forest Department also wants to promote Angria Bank as a high-end diving destination. "International divers could explore up to 22 m of deep waters. We will train locals as scuba instructors and guides for the tourists. But before this, we need to put some regulation in place to protect the biodiversity," Vasudevan adds.



MAHARASHTRA 5

SINDHUDURG

Green crab cultivation yields rich harvest

ANJALI LUKOSE
MUMBAI, AUGUST 22

WITH THE sale of around 900 kilograms of green mangrove crabs that were picked out from Vengurla in Sindhudurg district this week, the farmers of the area made close to Rs 8 to 9 lakh.

And this has kickstarted the first phase of the mangrove crab-farming initiative aimed at making profit from selling crabs that have been growing in the private (mangrove) lands in Sindhudurg district.

Scylla Serrata, commonly known as the mangrove crab or the green crab, is immensely popular in the market all over the world - specially in south east Asian countries.

Private mangrove lands, which are otherwise considered to be of no economic value, offer a conducive environment for the raising crabs.

Green crab species requires around eight months for achieving marketable size to earn maximum profit.

Bhaskar Rawool, one of the lucky ones who has already earned a huge profit because of the crab farming, said: "For years, I cursed the fact that there were



Chief Conservator of Forests, Mangrove Cell, N Vasudevan holds a crab as Leena Nair (R), chairman of Marine Products Export Development Authority, looks on. *Credit: Mangrove Cell*

mangroves on my land. It meant I couldn't construct anything or even cut the mangroves for firewood. But with this programme, I can turn my life around. In fact, now I encourage others to allow mangroves to grow on their land so they can earn a living from crab farming."

The project is part of an UNDP-GEF project in association with the Maharashtra forest department to achieve "mainstreaming marine and coastal biodiversity into the production sectors of Sindhudurg

district", while focussing on providing additional livelihoods to coastal communities. Scaling up of the crab farming units will certainly bring good revenue for the district," said N Vasudevan, chief conservator of forests, mangrove cell.

The natural stock of mangrove crab in the country was under threat from fishing activities. Besides exploitation, rapid urbanisation in the coastal belts had contributed to habitat loss of natural stocks. This initiative was launched to mitigate the loss.





The Hindu

August 31, 2015

Officials lay stress on whale shark protection

STAFF REPORTER

The government is considering compensating fishermen, who had their nets damaged by whale sharks, according Fisheries Commissioner Ram Shankar Naik.

He was participating as the chief guest at the International Whale Shark Day celebrations organised by EGREE Foundation, an initiative of the Union government and the UNDP, at JNTUK Alumni Auditorium here on Sunday.

Students, marine scientists and fishermen attended the function.

Observing that there has been a steep rise in the number of whale sharks in the seacoast of East Godavari district, Mr. Naik said Gujarat had pioneered in the protection of whale sharks by banning the sale and export of their meat and paying ex gratia to fishermen who left their nets at sea whenever they found the species in their nets.

“Similar practices should be adopted here to protect sharks,” he said, adding that compensation for damaged fishing nets would be announced soon.

Mr. B.C. Choudhury, Advisor to the Wildlife Trust of India, said the organisation would enter into a Memorandum of Understanding with the Forest Department for conducting a survey on whale sharks along the AP coast. “A multi-pronged strategy has been adopted in Gujarat to protect sharks. Similar practices have to be implemented here without any delay. Otherwise, whale sharks might get extinct soon,” he said.

EGREE Foundation director K. Tulasi Rao said the foundation had taken up a survey on whale sharks two years ago and had found that 72 species had been killed on the Kakinada coast after being caught by the fishermen during the period. He said a weeklong awareness programme had been launched to mark the International Whale Shark Day and that it covered several coastal villages and educational institutions as part of the awareness drive.

Govt. to compensate fishermen whose nets were damaged by whale sharks

Biologists identify 569 dolphins in Sindhudurg; numbers could be higher

Two species-the Indian Ocean Humpback dolphin (*sousa plumbea*) and Indo-Pacific finless porpoise (*neophocaena phocaenoides*)-were particularly found in these waters.

Written by **Aamir Khan** | Mumbai | Published:December 7, 2015 1:30 am



The survey, which began in May 2014, had to be stopped during the monsoons. The hiatus lasted four months following which the research team scanned 2,425 km on the boat extending to 17 nautical miles from the shoreline.

Biologists have discovered a flourishing marine life, identifying 569 dolphins, in Maharashtra's Sindhudurg district. The number, clarified marine biologist Ketki Jog, is not the estimated population. "It may be higher," she said.

Jog and her team comprising Mihir Sule, Isha Bopardikar, Vardhan Patankar and Dipani Sutaria, spent nine months scanning the coastline for the elusive creatures. What paved the way for these experts was a collaborative effort of the United Nations Development Programme, the Government of India and international funder Global Environment Facility.

Sule said that the survey was undertaken to assess the diversity of marine mammals along the coast of Maharashtra. Two species-the Indian Ocean Humpback dolphin (*sousa plumbea*) and Indo-Pacific finless porpoise (*neophocaena phocaenoides*)-were particularly found in these waters.

The survey, which began in May 2014, had to be stopped during the monsoons. The hiatus lasted four months following which the research team scanned 2,425 km on the boat extending to 17 nautical miles from the shoreline.

Among the many species found in the coastal waters, the team also sighted the blue whale and the Bryde's whale. "An estimation of their population can only be done after we analyse the data we have," said Jog.

The project's nodal officer and Chief Conservator of Forests N Vasudevan is content with the recent findings. "The survey is a first-of-its-kind, perhaps a first in the country. The team will once again return to the waters to assess the population of these cetaceans," he said.

The marine scientists made use of transect surveys, whereby they photographed the dorsal fins of the mammals. Each Humpback dolphin was identified by analysing a characteristic mark or a nick on its dorsal fin, and given ID numbers. Biologists plan to estimate the population of these marine animals on the basis of these identifications.

The dolphins were sighted near or around estuaries, an indication that they prefer waters within the influence of nutrient inflow of fresh water sources. In its report, the team has identified the coastline between the villages Bhogwe and Mhapan, and Vijaydurg creek as the hotspots of Humpback dolphins. The finless porpoises, meanwhile, were spotted between Bhogwe and Nivati villages, and Khawane to Mochemad villages adjoining coastal waters.

To trace dolphin tourism in Sindhudurg, the team interacted with local fishermen and hotel owners. It also helped the experts understand the need for sensitisation and awareness while working with the fishermen folk.

The biologists took 19 boat rides with different tour operators across locations and found the boatmen to be sensitive to the disturbance caused to dolphins. For better awareness, the team is designing posters for tourists, besides providing guidelines to operators asking tourists to follow certain etiquettes while in dolphin country. Among the 35 tourism units in the entire district, the report reveals that Devbag and Tarkarli villages see maximum dolphin tourism. In about 15 tourism units here, 300-350 boats ferry tourists, generating a net revenue of roughly Rs 4.5 crore every year.

The biologists said that the nascent industry needs to be regulated to ensure sustainability in the future. Some regulatory measures, they stressed, will have to be put in place to make sure that waters close to the shore are protected. “Growing numbers of high-speed parasailing crafts are a matter of concern,” they said.

Discovery of dolphins expected to boost Sindhudurg tourism

Fishermen in the district operate ferry rides to tourists for dolphin watching, from which, a revenue of INR 4.5 crore is estimated annually

By: [Mohit Rathod](#) | Updated: December 7, 2015 6:06 PM



Fishermen in the district operate ferry rides to tourists for dolphin watching, from which, a revenue of INR 4.5 crore is estimated annually

Biologists have discovered around 569 dolphins on the coasts of Sindhudurg, in Maharashtra. The findings, is seen as beneficial for growth of tourist activities in Sindhudurg, especially dolphin tourism, which is one of the major sources of income for local fishermen and hotel owners. Fishermen in the district operate ferry rides to tourists for dolphin watching, from which, a revenue of INR 4.5 crore is estimated annually.

The survey, conducted by the United Nations Development Programme, the Government of India and Global Environment Facility, was lead by a team of biologists who believe that the actual number of dolphins is higher. The Indian Ocean Humpback dolphin (*sousa plumbea*) and Indo-Pacific finless porpoise (*neophocaena phocaenoides*) were particularly found in the waters of Sindhudurg, along with which, the blue whale and Bryde's whale is also said to be sighted.

Commenting on the findings, Santosh Kakade, owner of a local travel agency, Sanjana Travels, said, "Dolphin tourism had started around seven-eight years ago, but in the last two years, it has seen a huge growth. This update will attract more tourists into Sindhudurg. Businesses of local fishermen and hotels will also benefit from it. A lot of people are still not aware about Sindhudurg as a dolphin-watching destination. I hope the authorities will promote tourism in the district."

According to the report, coastline between the villages Bhogwe and Mhapan, and Vijaydurg creek were identified as the hotspots of Humpback dolphins. The biologists interacted with the local fishermen and hotel owners to understand the significance of dolphin tourism, and are also working on creating awareness among them and tourists.

The report also reveals that Devbag and Tarkali witness maximum dolphin tourism, among the 35 tourism units.



THE TIMES OF INDIA

The Times of India

December 13, 2015

Konkan fisherwomen make sustainable profitable

Dec 13, 2015, 12.00 AM IST

With the demand for seafood booming in neighbouring Goa, women from Maharashtra's coastal villages are making a killing off crab and oyster farming.



Prize catch: Claws tied (above) up save the women from being nipped. (Photo courtesy: Dhiraj Singh/UNDP)

When the fishermen of Sindhudurg, on Konkan coast, go to sea, the women guard the crab farm that dots the mangroves in the area. The crabs are a prize catch, and there are at least a few hundred hiding in the mud. They have to be reared for months before they are ready for harvesting.

In a project aided by the UNDP, along with the ministry of environment, Maharashtra government, and supported by the Global Environment Facility, the fisherwomen of Sindhudurg are exploring crab and oyster farming as sustainable livelihood options. The larger aim of the five-year project is to conserve the mangroves, and marine biodiversity in this area. Around 40% of the mangroves in the state are privately owned, and mangrove crab farming is a lucrative venture.

The women here are part of the first collective of 11 women to take up crab farming. For years, they had caught crabs as wild catch, speared with an iron rod and either taken home to be cooked or sold in the market. But now, it is organized labour and comes with dignity. The project started almost two years ago and the first harvest was done this year. With what they've made so far, they've bought

themselves purple saris so they look like a team.

Suvarna Surendra Joshi, 60, peers through her thick glasses and pokes the mud at her feet with a stick in her search for crabs lurking around during low tide. She has to be careful to avoid the shoots sticking out and she has to work fast. The only time the women can catch crabs is during low tide; once the tide turns, the crab farm will be submerged.

With a 60% survival rate, crab farming is a lucrative business. Sindhudurg is close to Goa, where crabs are a much sought-after delicacy. The group has sold crabs worth Rs 40,000 from the first harvest. "It is a tedious task. It would be great if we could get some shoes and gloves to protect ourselves from crab bites," says Joshi.

Joshi's husband passed away years ago, and although her son is a fisherman, the family had to sell their small boat to make ends meet. Now the son is part of the crew on a local fisherman's boat. "On some days, I can earn Rs 400. Some days, nothing," says Joshi. Around 28.5 acres of land across 15 villages have been covered under crab farming. The number of crablets stocked in two phases total at about 44,415.

Under the same project, around 5,000 mangrove saplings have also been planted. For the pilot phase, the seeds were brought from the crab hatchery in Tamil Nadu, but now the state government is considering setting up a crab hatchery in Vengurla in Sindhudurg to help the project. "Partnerships such as this with the Maharashtra government are a powerful demonstration of our belief that biodiversity conservation and sustainable livelihoods for local communities can go hand in hand," says Yuri Afanasiev, United Nations Resident Coordinator and UNDP Resident Representative, India.



The Sindhudurg team made Rs 40,000 from the first harvest of crabs found in local mangroves.

In the government school building by the creek, women have gathered to listen to a man explain the various methods of oyster farming. PK Asokan, principal scientist at the Central Marine Fisheries Research Institute (CMFRI), explains how oysters have been farmed for centuries, that the demand for crabs and oysters is on the rise worldwide, and how organized marine farming can put the country's resources to good use. The CMFRI developed the oyster culture technology in the 1970s but could not use it because of low demand for oysters. The practice was adopted in Kerala, and Maharashtra decided to start a pilot project in Sindhudurg. The CMFRI was awarded the project and Wadatar, Taramumbri, Achra, and Devbag villages in coastal Maharashtra were singled out for bivalve farming.

Bamboo poles have been erected in the creek, and empty oyster shells have been strung up on ropes. These make resting places for oysters so that they can collect here instead of flowing away into the sea. When the pilot project on commercial oyster farming was awarded to 10 women in Wadatar creek in March last year, they hadn't anticipated an eight-fold return on the initial investment after the first harvest. "I have two daughters. With this income, I will fund their higher education," says Bhavna Juvadkar, 38, a local fisherwoman. "We are also encouraging other women to take this up."

On some days the women return empty-handed, but the collective's first harvest, 6,000 oysters, yielded Rs 50,000 for 125 kg of meat. Now, the group is waiting to harvest 9,000 more oysters in the coming months. The estimated production from a single raft of 150 sq m is 187 kg in 15 months. "The world over, people eat oysters live, and once the women have learned how to clean them, their value rises. Oysters grow on their own, unlike crabs that need to be fed. That's what makes it a great option," says Asokan.

The project is in its second innings. Harmful fishing techniques have impacted oyster populations globally and along India's coasts. This project seeks to reverse this by incentivizing oyster culture for local communities and preserving the ecosystem of marine culture in the process, says Asokan.

Maharashtra: Government launches artificial coral reef project in Malvan

[DHAVAL KULKARNI](#) | Updated: Dec 30, 2015, 07:50 AM IST, DNA



Malvan is one of the seven marine protected areas in India

To prevent the degradation of corals and enhance biological diversity off Maharashtra's coastline, the state government has launched a first-of-its kind project to set up artificial reefs and transplant corals at Malvan in Sindhudurg.

The Sindhudurg Coastal and Marine Ecosystem (SCME) is one of the 11 ecologically and economically critical habitats identified along the Indian coastline.

Though corals are also found at other locations in Maharashtra like Ratnagiri, Vengurla and Colaba in Mumbai, senior forest department officials involved with the initiative, said that the corals in Malvan were more abundant and were hard, reef forming ones unlike the soft ones found at other sites. The area has repository of 11 coral species and is a major fish landing spot and tourism destination.

"Malvan has a coral area but we have also noticed bleaching which happens due to global warming and others reasons (like) invasive species," N Vasudevan, chief conservator of forests, Mangrove Cell, told dna. Hence, the project, which involves set up of artificial reefs and transplantation of corals, is being undertaken and work has begun recently, he added.

Artificial reef blocks will be kept on the sea bed so that life forms can generate and start a new food chain. This will help fish aggregate and promote coral growth.

"However, we have noticed bleaching and have hence restricted transplantation efforts," said Vasudevan, adding that they would check the state of the transplanted corals and then proceed based on the results. The project will cover around 1 acre of area.

"The local community has been taken into confidence... we are operating with their consent," said Vasudevan, adding that this would ensure a long-term benefit for fisherfolk due to increased fish habitats and better fish landings and push up tourism potential.

Work on the Rs 80 lakh GOI- United Nations Development Program (UNDP)- Global Environment Facility (GEF) project is undertaken by the Tamil Nadu-based Suganthi Devadason Marine Research Institute (SDMRI). This is part of the larger Government of Maharashtra- GEF- UNDP project on 'Mainstreaming Coastal and Marine Biodiversity Conservation into Production Sectors in Sindhudurg Coast, Maharashtra' project launched by the Government of India in collaboration with the state government and UNDP.

A similar project which was undertaken in the Gulf of Mannar (in Tamil Nadu) has been successful, noted Vasudevan. "Corals were practically disappearing in many parts but were restored due to transplantation," he added, stating that these corals had been sourced locally instead of from sites like the Andaman Islands and Lakshadweep. Similarly, the corals to be transplanted at Malvan will also be sourced locally.

Moreover, bringing corals from far off sites also increased their mortality rate. Local species adapted better to conditions like turbidity, wave forces, light penetration and salinity.

The SCME area has a rich biodiversity including 367 species of marine flora and fauna, 73 types of mollusks and 74 and 3 species each of fish and sea turtles.

Around 29.12 sqkm area of the SCME has been designated as the Malvan Marine Sanctuary (MMS) in 1987 and is one of the seven marine protected areas in India.

UNDP BRINGS SCUBA TRAINING FOR SINDHUDURG COAST LOCALS

By Gitanjali Das, Mumbai Mirror | Updated: Jan 9, 2016, 05:51 AM IST

Locals of the Sindhudurg coast will soon be trained to become professional scuba divers as part of a programme conducted by the union government, in collaboration with the state government, the United Nations Development Programme (UNDP) and the Global Environment Facility (GEF).

The project, called, 'Mainstreaming coastal and marine biodiversity conservation into production sectors in the Sindhudurg coast, Maharashtra', aims at not just the conservation of coastal and marine biodiversity, but also at creating alternate opportunities for locals in order to divert them from typical employment such as fishing and other allied services, enabling better preservation of the Malvan Marine Sanctuary. While such a training program is extremely expensive, 75% of the expenses will be borne by the union government, UNDP and GEF (50%) and the MTDC (25%). Currently, only certified locals are permitted to carry out snorkelling expeditions for tourists. "Scuba diving is much more technical. If they are trained, they can even go on to become commercial divers, making a much better living than what they make today," said N Vasudevan, chief conservator of forests, mangrove cell. An interesting part of this training is that locals will utilise the dives conducted during the training programme to eradicate ghost fishing nets (those abandoned in the sea by boats, in which several marine animals often get stuck) from marine biodiversity hotspots in and around the Marine Malvan Sanctuary.

The project has been awarded to the Indian Institute of Scuba Diving and Aquatic Sports, affiliated to the Maharashtra Tourism Development Corporation (MTDC). Paraag Jain, MTDC's managing director, said, "The program will be starting in a month's time and will last for a month as well. We will also hold lectures for the locals about how marine conservation."

<https://mumbaimirror.indiatimes.com/mumbai/other/undp-brings-scuba-training-for-sindhudurg-coast-locals/articleshow/50505684.cms>

मालवणच्या समुद्रात कृत्रिम प्रवाळ

Maharashtra Times | Updated: Jan 24, 2016, 12:25AM IST

डॉ . श्रीकांत कार्लेकर



मालवणच्या समुद्रात कृत्रिम प्रवाळ

किनाऱ्यावरील प्रवाळांचा ज्हास रोखण्यासाठी आणि सागरी जैवविविधता अधिक समृद्ध करण्यासाठी महाराष्ट्र सरकारने मालवणच्या किनाऱ्यावर कृत्रिम प्रवाळ मंच (आर्टिफिशियल कोरल रीफ) निर्माण करण्याच्या महत्त्वाकांक्षी प्रकल्पाची नुकतीच सुरुवात केली आहे. महाराष्ट्राच्या किनाऱ्यावर कुलाबा, रत्नागिरी, विजयदुर्ग आणि वेंगुर्ला या ठिकाणी समुद्रात प्रवाळ सापडत असले, तरी मालवणच्या किनाऱ्याजवळ ते विपुल प्रमाणात आढळून येतात. शिवाय मालवण जवळचे प्रवाळ हे कठीण आणि मंच किंवा भित्ती (रीफ) तयार करू शकणारे जीव आहेत. इथे प्रवाळांच्या ११ प्रजाती आणि सागरी प्राण्यांच्या व वनस्पतींच्या ३६७ प्रजाती आढळतात.

सिंधुदुर्ग जिल्ह्याची किनारपट्टी आणि सागरी परिसंस्था ही भारताच्या पूर्व आणि पश्चिम किनाऱ्यावरील पर्यावरणीय व आर्थिकदृष्ट्या महत्त्वाच्या असलेल्या ११ सागरी आवास व परिसंस्थांपैकी एक आहे.

मोठ्या प्रमाणावर आढळणाऱ्या या प्रवाळांची आज जागतिक तापमान वाढ आणि समुद्र पातळीची हालचाल यामुळे मोठी हानी होऊ लागली आहे. ती कमी करण्यासाठी, तसेच प्रवाळ परिसंस्था समृद्ध करण्यासाठी या प्रकल्पाचा फायदा होईल.

प्रवाळ मंच (कोरल रीफ) तयार करणारे प्रवाळ (कोरल) हे एकत्रितपणे चुन्याचे संचयन करून विस्तृत वसाहती करणारे सागरी जीव आहेत. सध्याच्या युगातील प्रवाळ हे खंडीय मंच किंवा समुद्रबुड जमिनीवर (कॅटिनेटल शेल्फ) आणि खोल समुद्रातील बेटांच्या अवती भोवती वाढताना आढळतात. समुद्राच्या पाण्याचे १६ अंश ते ३६ अंश सेल्सिअस इतके तापमान, दर हजारी २५ ते ४० इतकी क्षारता, घट्ट व गुळगुळीत सागर तळ, पाण्याची सहज हालचाल आणि जोरदार भरती प्रवाह अशी परिस्थिती असणारे अपतट प्रदेश प्रवाळ वाढीला आदर्श असतात. गाळयुक्त प्रवाह किंवा गाळाचे संचयन प्रवाळांच्या वाढीला प्रतिकूल असते.

समुद्रात २० मीटर खोलीपर्यंत सूर्यप्रकाश पुरेशा प्रमाणात पोहोचू शकतो. त्यामुळे या खोलीपर्यंत प्रवाळांची चांगली वाढ होऊ शकते. जगात अनेक ठिकाणी ६० ते ७० मीटर खोलीवरही प्रवाळ आढळतात. मात्र त्यातील काही मृत असतात. मृत प्रवाळांच्या वसाहतीतच नवीन प्रवाळ जन्म घेतात आणि त्यामुळे प्रवाळ मंचांचा विस्तारही वाढतो.

उथळ सागरतळांवर आणि सागरी बेटांच्या किनाऱ्याजवळ तयार होणाऱ्या प्रवाळ खडकांना प्रवाळ भित्ती (कोरल रीफ) किंवा मंच असे म्हटले जाते सीमावर्ती किंवा फ्रिंगिंग रीफ, रोधक किंवा बॅरीयर रीफ आणि कंकणाकृती किंवा अटॉल असे त्यांचे मुख्य प्रकार आहेत. प्रवाळांच्या वाढीस आणि प्रवाळ खडकांच्या निर्मितीसाठी अतिशय अनुकूल अशी उष्ण कटिबंधीय परिस्थिती असूनही भारताच्या पूर्व आणि पश्चिम किनाऱ्यावर प्रवाळ हे खूप कमी ठिकाणी आणि विखुरलेल्या भागातच आढळतात. वायव्येकडील कच्छचे आखात, अति दक्षिणेकडील तटीय प्रदेश, लक्षद्वीपचा समुद्र, मंगलोरच्या पश्चिमेला समुद्रात शंभर किमी अंतरावर गावेशनी इथे, पूर्व किनाऱ्यावर कुडालोरपासून पट्टेचेरीपर्यंत मंडपम आणि रामेश्वरमच्या नैऋत्येस, मानारच्या आखातात आणि तुतिकोरीन पर्यंत किनाऱ्याजवळ लहान मोठी प्रवाळ खडकांची बेटे विखुरलेली आढळतात भारताच्या किनाऱ्यावर प्रवाळांचे ३४० प्रकार आढळतात. प्राचीन काळात भारताचे अपतट (ऑफशोर) प्रदेश प्रवाळांनी आणि प्रवाळ खडकांनी समृद्ध होते. गेल्या काही दशकांत किनारी प्रदेशांत होणारे तेलजन्य व प्रदूषित उत्सर्जन आणि औद्योगिक प्रदूषण यामुळे व मासेमारीचे वाढते प्रमाण आणि खारफुटीचे पुनर्प्रापरण (रिक्लेमेशन) यामुळे हे प्रमाण खूपच घटले आहे. कच्छचे आखात, लक्षद्वीप समूहातील पिट्टी बेटे, मानारचे आखात, मालवण वेगुर्ले किनारपट्टी व अंदमान ही आज प्रवाळ प्रदेशांच्या संरक्षणाची नितांत गरज असलेली ठिकाणे आहेत. भारताच्या किनाऱ्यावर नवीन प्रवाळ तयार होण्यासारखी परिस्थिती दिवसेंदिवस कठीण होते आहे. किनाऱ्यावरील वाढते प्रदूषण आणि आपल्या सगळ्यांनाच समुद्राबद्दल वाटत असलेली अनास्था यामुळे जैव विविधतेने समृद्ध असे हे प्रदेश नष्ट होण्याच्या मार्गावर आहेत.

प्रवाळ आणि प्रवाळ बेटे ही पर्यावरण बदलांच्या दृष्टीने खूपच संवेदनशील असतात. प्रवाळ बेटावरच्या पर्यावरणात अगदी थोडासाही बदल झाला तरी बेटावरील प्रवाळांच्या संपूर्ण वसाहतीवर त्याचा दूरगामी व संहारक परिणाम होऊ शकतो. किनाऱ्याजवळ निर्माण होणाऱ्या ऊर्जानिर्मिती केंद्रांतून उष्ण पाणी समुद्रात सोडले जाते. उथळ सागरजलाच्या तापमानात अशी वाढ झाल्यावर २० मीटरखोलीपर्यंतची प्रवाळ बेटे नष्ट होतात.

कृत्रिम प्रवाळ मंच निर्माण करण्याच्या प्रकल्पांतर्गत इतर सागरी प्रदेशातून आणलेले मंचांचे तुकडे (रीफ ब्लॉक) मालवणच्या सागरतळावर आणले जातात. त्यातूनच नवीन प्रवाळ जन्माला येऊ लागतील. इतर जलचर त्याभोवती जमतील आणि प्रवाळांची संख्या वाढू लागेल. एक एकर क्षेत्रात राबविण्यात येणाऱ्या या प्रकल्पात, दुसरीकडून आणलेल्या प्रवाळांच्या वाढीचा सतत अभ्यास करूनच पुढील प्रकल्प राबविला जाईल. त्यानंतर प्रवाळ मंचाची जैवविविधता नजीकच्या भविष्यात भरपूर वाढेल. विस्तृत मत्स्यक्षेत्रे आजुबाजूला तयार होतील आणि मासेमारी व्यवसायही वाढीस लागेल. यापूर्वी तामिळनाडूत मानारच्या आखातात कृत्रिम प्रवाळ मंच तयार करण्याचे प्रयोग यशस्वी झाले आहेत.

कृत्रिम प्रवाळ मंच ही समुद्र तळावर तयार केलेली मानव निर्मित संरचना असते. सामान्यपणे सागरतळाच्या सपाट व उंचवटे आणि खड्डे नसलेल्या भागात ती तयार केली जाते. टायर, रिग्स, बुडालेल्या जहाजाचे अवशेष याचाही असे मंच तयार करण्यासाठी उपयोग जगभरात केला गेल्याचे दिसते.

कृत्रिम प्रवाळ मंच तयार करण्याची पद्धत हजारो वर्षे जुनी आहे. वेगवेगळ्या कारणांसाठी ती वापरली गेली. पर्शियन लोकांनी सर्वप्रथम तैग्रिस नदीच्या मुखापाशी सागरी चाच्यांना अटकाव करण्यासाठी कृत्रिम प्रवाळ भित्ती तयार केल्याचे उल्लेख आढळतात. मोठ्या प्रमाणावर मासे मिळावेत म्हणून जपानमध्ये १७व्या शतकाच्या सुरुवातीला दगड धोंडे व गाळाचा वापर करून अशा भित्ती तयार केल्या गेल्या. १८३० नंतर मात्र यासाठी लाकडाचे मोठमोठे ओंडके, गाड्या, युद्ध काळातील अवजारे या गोष्टीदेखील वापरल्या गेल्या. अशा तऱ्हेच्या गोष्टी समुद्र तळावर विशिष्ट खोलीवर ठेवल्या तर त्याभोवती सागरी वनस्पती, मासे आणि प्रवाळ यांच्या वसाहती काही वर्षांतच तयार होतात.

जगभरातील कृत्रिम प्रवाळ मंच किंवा भित्ती प्रकल्पातून असे लाक्षात आले आहे की, हे मंच खूप जास्त जैव वस्तुमान (बायोमास) तयार करत नाहीत. हे मंच आजुबाजूच्या पाण्यातील माशांना केवळ आकृष्ट करतात. त्यामुळे त्याभोवती मोठ्या संख्येने मासे दिसू लागतात. यातून असा गैरसमज निर्माण होतो की कृत्रिम प्रवाळ मंच भरपूर मासे निर्माण करायला मदत करतात. पण प्रत्यक्षात तसे नसते.

कृत्रिम प्रवाळ मंचाजवळ नैसर्गिक प्रवाळ मंच असले तर त्यावर प्रतिकूल परिणाम होतो असे लक्षात आले आहे. प्रवाळ मंचाच्या आकारानुसार, कोणत्या प्रजातीचे व किती मासे त्याकडे आकृष्ट होतील ते ठरते. लहान आकाराच्या नैसर्गिक प्रवाळ मंचाकडे मासे कमी संख्येने आकृष्ट होण्याचा धोकाही यात असतो. समुद्रात बुडालेली जहाजे, होड्या यांचा उपयोग करून प्रवाळ मंच बनविले तर त्याभोवती एक नवीन आहार संरचना तयार होऊ लागते व आजुबाजूच्या नैसर्गिक प्रवाळ मंचाभोवतीची सागरी परिसंस्था बिघडू लागते. जवळपासचे अनेक सागरी जीव कृत्रिम प्रवाळ मंचाकडे आकृष्ट होऊन स्थलांतर करू लागतात. परिणामी सागरी जीवांचे अनेक नैसर्गिक आवास बदलू लागतात.

एका संशोधनानुसार कृत्रिम प्रवाळ मंचामुळे जवळपासच्या नैसर्गिक मंचांच्या न्हासाची सुरुवात होऊ लागते, तसेच अनैसर्गिक अन्नसाखळी आणि आहार संरचनेला पोषक वातावरण तयार होऊ लागते. टायरचे ढीग समुद्रतळावर टाकून, फ्लोरिडासारख्या भागात खूप मोठ्या प्रमाणात कृत्रिम प्रवाळ मंच निर्मितीचे प्रयोग केल्याचे आढळते. असेच प्रयोग डिलावेर, मेक्सिको, जिब्राल्टर, दुबई, फिलिपाइन्स येथेही करण्यात आले आहेत. मात्र टायरसारख्या अनैसर्गिक गोष्टी वापरल्यामुळे समुद्राच्या पाण्याचे प्रदूषण होते व प्रवाळ वाढ खुंटते. त्यामुळे सागरी पर्यावरणाचा योग्य अभ्यास केल्याशिवाय असे प्रयोग करणे धोक्याचे ठरू शकते. पट्टुचेरीच्या किनाऱ्याजवळ आणि केरळला कोवालम येथे १८ ते २० मीटर खोलीवर सिमेंट, खडक, धोंडे, झाडे आणि लोखंडी सळ्या वापरून कृत्रिम प्रवाळ मंचाची निर्मिती केली गेली. मालवण किनाऱ्यावर हा प्रकल्प नेमका कशा पद्धतीने राबविला जाणार याची माहिती अद्याप उपलब्ध नाही. मात्र, हा प्रयोग राबविताना जगभरातील अशा प्रयोगांचे फलित लक्षात घेणे गरजेचे आहे. समुद्रात ज्या ठिकाणी हा प्रकल्प नियोजित आहे तेथील नैसर्गिक प्रवाळ व सागरी पर्यावरण यांना धोका पोहचू नये याची खबरदारी घ्यायला हवी.

THE ASIAN AGE

The Asian Age

February 26, 2016

Government to use data, experts to handle mammal strandings

ANKITA SENGUPTA

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The dead Bryde's Whale that was washed ashore on January 28, 2016

In light of the increasing number of sightings and stranding incidents of marine animals in Maharashtra, the state forest department together with United Nations Development Programme (UNDP) has decided to collect data and also rope in international marine mammal experts to help them in developing skills towards conservation of these animals. This will also help in equipping the department to handle situations of stranding more effectively, said a source from the forest department.

The joint efforts began with a workshop on Thursday where the protocol to be followed during a live or dead stranding of any marine mammals like whales, dolphins and porpoises, was discussed.

Speaking during the inauguration of the workshop, N. Vasudevan, the chief conservator of forests, said, "Due to the increasing instances of whale, dolphins and other sea mammals in Maharashtra, it was imperative that we take steps to monitor such incidents, gather and analyse data that will help us in conserving these animals."

According to a UNDP outreach and monitoring associate, very little information exists on the different marine mammal species of India and a comprehensive approach needs to be adopted for protecting these animals.

However, the GoI-UNDP-GEF Sindhudurg project, (UNDP's current project with the Union ministry of environment) has initiated several steps towards capacity building of officials and coastal communities and population assessment of marine mammals.

The international experts who have been included in the project include an ocean expert and acoustic engineer from UK, Dr Nicholas Tregenza and a marine biologist from USA, Dr Sarah Piwetz.

After the workshop, one of the experts Dr John Wang said that after his interaction with the officials from the forest department, he was convinced that the government is serious about the issue of frequent stranding of marine animals off the coast of Maharashtra.

Recent instances Last year, a mother-calf pair of blue whale had been sighted off the Sindhudurg coast in Maharashtra, which was reported as the first such sighting in over a 100 years. Soon after, in June 2015, a 45-foot long blue whale died in Alibaug in a rare case of live stranding. In February, forest officials and a group of villagers rescued a 40-foot long blue whale, which was stranded on the shallow waters at Kolthare beach in Dapoli taluka, Ratnagiri district. There have also been a few other incidents of beaching of other species of whales such as the Bryde's Whale, the Sperm Whale and the Humpback Whale along the state coast in recent years. The latest among these was the washing ashore of a dead Bryde's Whale at Juhu beach on January 28. The different species of whales are protected under Schedule II Part-I of the Wildlife Protection Act, 1972.

NEW FIND ■ One-year study finds presence of the semi-aquatic animal in all 14 creeks in the region ■ It indicates good water quality

What can be Sindhudurg's mascot? Otter is a good choice

Virat A Singh virat.singh@dnaindia.net

Mumbai: Sindhudurg has some good news. And guess who is bringing it? The good old otter.

For one, the presence of the very shy, semi-aquatic animals in an area indicates that the water quality there is good, say experts. An ongoing study has found otter presence in all the 14 creeks in Sindhudurg.

"The aim of the study is to understand the smooth-coated and small-clawed otters, their habitat and food preferences, broad ecology and threats to them," said Dr Satish Pande, director of Ela Foundation.

The one-year study, Status of Otters in the Mangroves habitats of Sindhudurg, is being conducted by the Pune-based Ela Foundation with the State Mangrove Cell as



An otter at a Sindhudurg creek

—Dr Satish Pande

part of a Government of India-United Nations Development Project (UNDP).

The study started almost six

months ago and it has finished surveying all the 14 creeks, some of which are as long as around 45-km long, said Pande.

"Otters are mainly active around dawn and dusk and hence we have to track otter dens by finding their faecal matter and traditional sites with the help of local fishermen. Locating these sites is quite hard and our team is using boats as well as travelling on foot," said Pande. Camera traps are also used to study and document their behaviour.

As per the international code, the team has an intensive survey unit (ISU) to study otter habitat in the mangroves of Sindhudurg. It has found otters ranging from a minimum of two to a raft of 12 in the area. This is just the initial finding. A lot more study has to be done on this front.

About the immediate threats, Pande said that, till a few years back, otters were poached for their furs, which were in great demand

in China and a few other countries. So much so that for every tiger skin the forest department used to seize, there would be 10 otter fur.

"Now poaching is almost nil, but otters face threat from water pollution and habitat destruction, especially destruction of mangroves. One of the major threats is sand-dredging," he said.

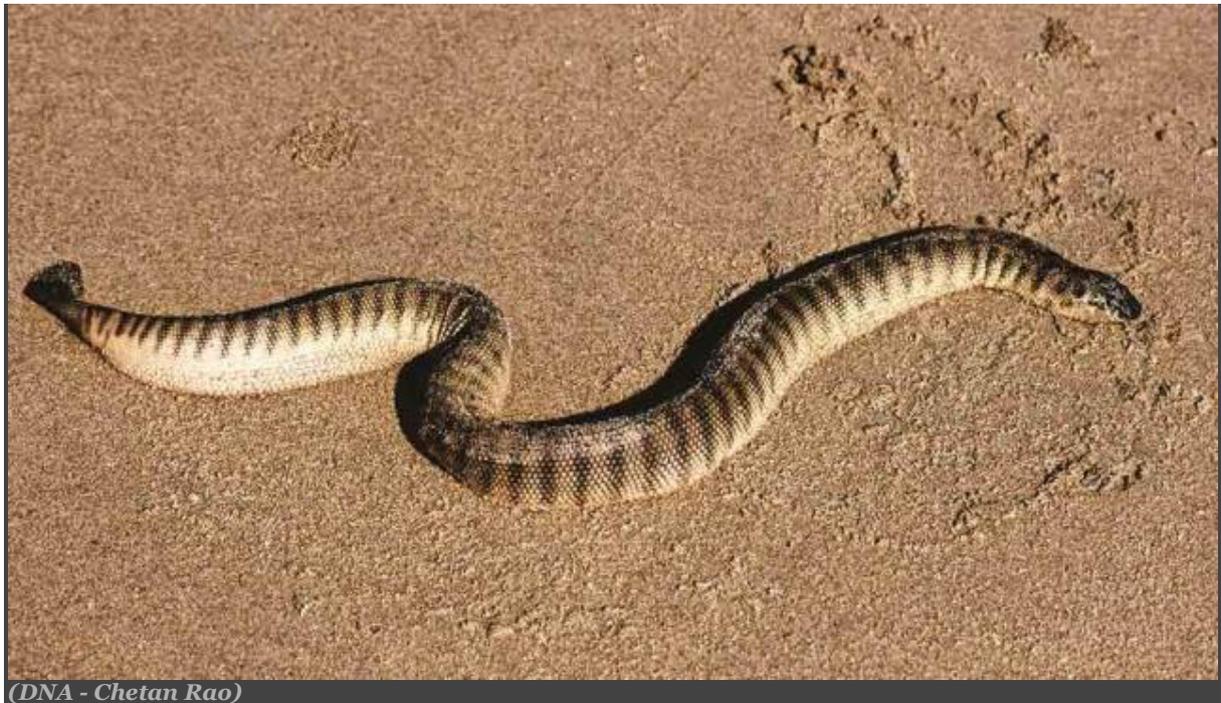
N Vasudevan, chief conservator of forests and head of the Mangrove Cell, said that there is no comprehensive data available on otters in mangrove habitats.

Otters are not only on top of the marine food chain but also indicate water quality. "It's always been our priority to document and study all kinds of marine biodiversity in the waters as well as mangroves of Sindhudurg so that we can increase steps to conserve them," he said.

Fishing in Maharashtra coast taking a toll on sea snakes

[VIRATA SINGH](#) | Updated: Jun 13, 2016, 06:58 AM IST, DNA

Venomous reptiles, which get caught in fishermen's net and die, are natural caretakers of marine ecosystem.



(DNA - Chetan Rao)

A first of its kind detailed study on venomous sea snakes is being conducted in Maharashtra. The study is not only trying to understand the impact of fishing practices on sea snakes in Sindhudurg district, but also their ecology and status.

Sea snakes inhabit near shore waters and their diet is fish. They act as natural caretakers of the marine ecosystem by controlling the fish population.

Globally, a lot of noise is being made by conservationists over their decline due

to poaching and extensive fishing. This study, sanctioned by Maharashtra State Mangrove Cell under the GOI-UNDP-GEF Sindhudurg Project

"Our study is limited to Devgad, Malwan and Vengurla as these three witness extensive fishing. Fishermen themselves have told us that during peak season in one single catch nearly 50 sea snakes are caught in the nets and many end up getting killed," said wildlife biologist Chetan Rao. He added that the study will throw light on aspects like the diversity of sea snakes, their mortality rates, important areas as well as the perception of the local communities towards the species.

The team that finished its field work in May accompanied fishermen during their regular fishing trips to record catch, especially the numbers and species of sea snakes caught in nets. They also interviewed fishermen to gain an insight.

"Sea snakes get entangled in the nets laid by trawlers and they are also susceptible to pollution and excessive fishing, which may lead to local extinction as the sea snake population is highly localised. In our study so far, we have only found two species — Hooknose sea snake and Spine bellied sea snake. The latter is far more susceptible to dying in the nets," shared Rao who is heading this study, adding that the venom of Hooknose is said to be more potent than that of a cobra.

The researchers who kept checking the catch in the nets observed that in most cases two different species of sea snakes were never found caught together.

All the data estimates, including their diversity and catch, will be compiled and this will help assess the conservation status for these data deficient species. They also plan to provide information in the form of booklets and posters to help fishermen identify sea snakes.

The biologists plan to work closely with the community. "Fishermen are most vulnerable as there are high chances of them being bitten while they are removing fishes or sea snakes stuck in their nets. Hence, we also want to

create a lot of awareness on this issue as most of this bite could occur when the fisherman was in mid sea," informed Rao adding that none of the fishermen were killing the sea snakes on purpose.

There are more than 55 species of sea snakes found in the Indian Ocean making them one of the most diverse of all the marine reptile fauna. The biologists claimed that this long-term study will also help build up a long-time data set as well as help and monitor the changes to sea snakes population and diversity along the West coast.

What are sea snakes

Sea snakes are extremely venomous marine reptiles and the species found in India can vary from 2 ft to 5 ft long. They have a single lung and have to come to the surface to breathe. Hence, when caught in the fishing nets most of them die due to drowning. The sea snakes are known to give birth to live young ones directly.

Why sea snakes are important

Sea snakes inhabit near shore waters and their diet is fish. They act as natural caretakers of the marine ecosystem by controlling fish population. They mostly feed on fishes that are herbivores and feed on phytoplankton and thus help indirectly in avoid overgrazing of phytoplankton. They also act as a source of prey to larger carnivores such as sharks, sea eagles and others. If the population of sea snakes is affected, the ecosystem will be imbalanced and its cascading effect may result in lowering of fish population from the area which in turn may affect fishermen.

Coastal tourism: To reduce pressure on Malvan, 12 tourist-friendly areas identified

ROHIT ALOK
MUMBAI, JANUARY 8

TO ENSURE that coastal tourism in Sindhudurg does not stress the marine environment by overcrowding at one spot, a project funded by the UN and the Centre has identified 12 locations where watersports such as

scuba diving, snorkeling and others can be offered.

Government officials said all the 12 locations are along the 121-km coast of Sindhudurg district and the sites are within 10 kilometers from the coast.

"At present, a majority of these activities take place in the Malvan area of the district. This is impacting marine life, and in

order to ease the pressure here, other places along the coast were scouted," said a senior official.

This exploration of new sites was funded by the United Nations Development Programme and the Ministry of Environment, Forests and Climate Change, and an interim report submitted to the state on October 30, 2016.

State officials said the move to look for more sea water activity sites in Sindhudurg would further promote the region as a tourism district, and it was wiser to focus on more areas. "It was a strategy to divert tourists from Malvan to nearby areas in the same district," said Chief Conservator of Forest (CCF) N Vasudevan, who was a part of the exploration.

Vasudevan added that the waters off the coast of Sindhudurg had special features with great potential to boost tourism. "The water there is the clearest

along the coast and there is a diverse range of corals. Near Vengurla, there is a very high diversity in fish, which includes rare predator fish," Vasudevan said.

A report has also been prepared on how tourism can positively impact livelihood of the local residents. "We expect close to 3,000 persons to be employed in various capacities once the new areas are developed. Currently in Sindhudurg, the batch of persons who were first affiliated with us earns at least Rs 40,000," an official claimed.

"About 13 lakh tourists had visited Sindhudurg last year. The water sport activities here are more affordable, which is one of the reasons why it is an attractive spot," said Sarang Kulkarni, marine biologist and chief instructor at The Indian Institute of Scuba Diving and Aquatic Sports (IISDA), which is the state's sole scuba diving centre.





India Today

January 9, 2017

A UN-funded project has just introduced 12 new coastal spots in Maharashtra

United Nations has identified 12 new coastal locations for tourism in Sindhudurg.

IndiaToday.in | Posted By Disha Roy Choudhury
January 9, 2017 | UPDATED 14:58 IST

If tourism in Maharashtra has been progressive, this new development will mark another milestone in boosting the industry. The state now has 12 new coastal tourist locations, identified through a project funded by United Nations and the Centre.

These new tourists sites have been identified along the 121 km coast of Sindhudurg, as part of the efforts to reduce excessive tourist traffic in the region. So far, majority of the tourist activities were concentrated in the Malvan area of the district which in turn were impacting marine life adversely.

The new locations, within 10 kms from the coast, were scouted with fundings from United Nations Development Programme and the Ministry of Environment, Forests and Climate Change, and an interim report submitted to the state on October 30, 2016.

While this new move echoes the world-wide thrust on Responsible Tourism, the state is also banking on the clear waters and marine life as the USP to attract more number of arrivals to the region. "The water there is the clearest along the coast and there is a diverse range of corals. Near Vengurla, there is a very high diversity in fish, which includes rare predator fish," Chief Conservator of Forest (CCF) N Vasudevan was quoted saying by The Indian Express. Besides, these new sites will also offer various sea water activities like scuba diving and snorkelling to further divert tourist pressure from Malvan.

Local residents too will be having their fair share of impact of this strategy. A report prepared on these lines anticipate employment generation for close to 3000 people in various capacities. The first batch of people in Sindhudurg, who were affiliated with the state, were reportedly earning at least Rs 40,000.

Sindhudurg recorded around 13 lakh tourist arrivals last year owing to the affordability and variety of water sports that the region offers.

Square mesh nets help fishermen save money, marine animals

The Maharashtra government and United Nations Development Programme (UNDP) came up with the idea of square mesh nets instead of traditional diamond mesh nets to prevent damage to the ecosystem and to make fishing sustainable

MUMBAI Updated: April 09, 2017 17:04 IST

Ankita Sengupta
Hindustan Times



On an average catch of 18 kilogram, it is estimated that the square mesh nets allow over three kilogram of juvenile fish to escape, making marine fishing sustainable (Siddhant Jumde)

Fishermen in Sindhudurg have found a way to save thousands of rupees each month while saving lakhs of baby fish and other marine wildlife.

The Maharashtra government and United Nations Development Programme (UNDP) came up with the idea of square mesh nets instead of traditional diamond mesh nets to prevent damage to the ecosystem and to make fishing sustainable. Under a programme funded by Global Environment Facility, the Central Institute of Fisheries Technology experimented

with the square mesh nets in trawlers to see if it reduced by-catch or the trapping of baby fish and other marine wildlife that are not commercially important to fishermen.

Usually, by-catch accounts for about 5% of a fisherman's daily catch. And even though it may not appear to account for much economically, it includes commercially important fish species such as squids, croakers, thread fin breams and scads. If these fish had reached maturity, they could have added to the fishermen's profit and helped in maintaining an ecological balance.

“By-catch harms marine ecology as thousands of marine animals are killed before they can mature and reproduce, leading to a reduction in their population,” said Sneha Pillai, a member of United Nations Development Programme (UNDP) that has been helping in making fishing sustainable.

During trials, the fishermen discovered that when the traditional diamond-shaped nets are in water, the gaps in the nets compressed, leaving little room for smaller fish to escape. But the square shaped mesh retained its shape under water and juvenile fish that are less than 10 centimetres long, escaped through the gap in the nets.

On an average catch of 18 kilogram, it is estimated that the square mesh nets allow over three kilogram of juvenile fish to escape, making marine fishing sustainable.

For 50-year-old Shelestian Fernandes from Malvan — who has been a fisherman for over two decades — the square mesh nets do more than saving baby fish. It saves him around Rs20,000 per month. As the weight of the catch reduced, Fernandes ended up saving almost 10 litres of fuel every day. Another fisherman Dada Dhuri, 53, said, “The new nets have helped me save about Rs10,000 each month because my trawler uses lesser amount of diesel now.” He has also been spreading awareness about square mesh nets among other fishermen.

Encouraged by the results, about 317 trawlers in the area have adopted the square mesh nets. Also, the district planning and development council released Rs19 lakh so that more fishermen get access to these nets. Recently, Maharashtra's fisheries department issued an order proposing the mandatory use of square mesh nets for about 17,000 trawlers in the region.

Maharashtra to set up India's 2nd crab hatchery among mangroves in Sindhudurg

Crab farming will also help in protecting mangroves as the mud crabs thrive in wetlands. The hatchery can produce one million crablets in a year.

MUMBAI Updated: Apr 16, 2017 00:45 IST

Ankita Sengupta
Hindustan Times



Crab farmers pose with their harvest at Sindhudurg.(UNDP)

Mumbai: Armed with Rs24 crore that the Maharashtra budget allocated to it, the mangrove cell has decided to use a part of it to set up a crab hatchery in Sindhudurg. The district along the Konkan coast is lined with mangroves which offer ideal conditions to rear mud crabs.

The hatchery will have the potential to produce one million crablets in a year. It will have dedicated sections for keeping parent crabs, spawning, hatching and larval rearing. The facility is expected to be completed this year and will be functional from 2017. The mangrove cell intends to spend Rs9 crore on this project and plans to create more hatcheries along the coastline.

Presently, Tamil Nadu is the only state in India that produces crablets and Maharashtra has, for the past two years, been procuring the baby crabs from them and rearing them in the wetlands.



Adult mud crabs for sale in Sindhudurg. (UNDP)

Speaking about the need to open a hatchery in Maharashtra, the chief conservator of forest, mangrove cell N Vasudevan said, “While flying in crablets from Tamil Nadu, some of them do not survive the journey. Setting up a hatchery will make crab farming more profitable and reduce their mortality rate.”

The hatchery will also boost attempts to conserve mangroves as owners of private mangrove lands who would consider their property to be of little economic value can end up earning lakhs from it. In 2015, crab farmers in Vengurla taluka in Sindhudurg district made around Rs9 lakh from selling the crabs that they had reared.

Sandip Gawade Shiroda, 40, a crab farmer from Vengurla had made Rs50,000 by selling off his first batch of crabs in 2015. But, in 2016 he earned Rs2 lakh.



A crab farm enclosed in mesh nets. (UNDP)

“Rearing mud crabs does not need too much work. For the first month I keep the crablets in a 8X4 metre enclosure where they are fed waste fish. Then they are released into mangrove lands or ponds which have mesh nets to keep the crabs within my farm,” said Shiroda. The crabs would be harvested once they reach their full size within eight months, he added.

“These crabs eat barnacles and oysters that are found in abundant in wetlands. It also keeps the wetlands clean by eating dead fish. So the investment would mostly be in terms of buying the crablets,” said Subir Ghosh, a project co-ordinator of United Nations Development Programme (UNDP) that has partnered with the government in the crab farming

project. Currently, crablets from Tamil nadu are bought at a subsidies rate of about Rs16 each and a fully grown mud crab can be sold for Rs1,000.



An adult crab can be sold for ₹1,000. (UNDP)

Explaining how crab farming plays a role in protecting mangroves, Vasudevan said, “Earlier, owners of private mangrove lands would try to destroy the mangroves by dumping debris as they thought that they were of no use to them. But ever since we started crab farming in the region, several private owners have sought help from us to rear crabs on their property as well.” He added, “This will ensure that people protect mangroves as these crabs thrive in mangrove lands.”

How Sustainable Is The Fishing Industry In India?

The fishing industry in India employs over 14 million people, according to a survey conducted by Food and Agriculture Organization department of the United Nations

20 April, 2017
by Anurit Kanti



The fishing industry in India employs over 14 million people, according to a survey conducted by Food and Agriculture Organization department of the United Nations.

India constitutes to about 6.3 per cent of the global fish production. However, as one

of the sustainable development goals is to aim for a better aquatic balance, India has a long way to go to become a country which uses 100 per cent sustainable fishing practices.

As a result of overfishing and unsustainable fishing practices such as trawling (that damage aquatic life to a large extent), the aquatic ecosystem and the fishing communities (specifically in Maharashtra and Tamil Nadu) have suffered for a long time.

With a highly unregulated and informal supply chain, the fishery laws are left up to the communities to interpret without any enforcement. A law under India's Marine Fishing Regulation Act orders "prohibition on certain fishing gear, regulation on mesh size, establishment of closed season and areas, demarcation of zones for no trawling, in addition to other measures such as the use of turtle excluder devices and designation of no fishing areas", most of which are highly unregulated.

Supply and demand

When it comes to demand, there is no awareness among consumers on what method of fishing is to be used. A sudden shift in demand towards sustainable fishing might also impact the lower-rung fishing communities who might not have the required resources to shift to sustainable practices.

Concerns about overfishing may not bother them much, given how this is the classic scenario of the tragedy of commons. In supermarkets too, where upper class citizens procure the catch, the labelling does not provide enough information regarding the sourcing of the fish. With negligible earnings, a majority of the fishing community suffers from debt-ridden issues, depleting fish stocks and poverty, while the larger fisheries exploit the aquatic life.

Sustainable fishing and MSC certification

Sustainable fishing implies ensuring sustainable fish stocks, minimizing environmental impact by maintaining a structure, productivity, function and diversity of the aquatic ecosystem and effective fisheries management which is responsive to changing circumstances. It also implies combating illegal fishing and cutting out destructive fishing practices.

All hope is not lost, as some fishing communities, such as Indian clam fishery in the Ashtamudi estuary in Kerala, have achieved the Marine Stewardship Council's (MSC) 'Blue Label Certification', which certifies that their fishery uses sustainable

methods of fishing.

The methods of conservation used are providing a steady source of income for the fishermen, where one boat brings about 200kgs of fish a day, generating an income of Rs.1,500 per day. Some methods of sustainable fishing followed restrict fishing, by banning fishing activities from December to February, the breeding season for clams (a type of shell fish), imposing mesh size restrictions for nets of 30mm, along with a minimum export size of 1400 clams/kg, and a prohibition on mechanical clam fishing.

After facing declining stocks, the collaboration between MSC, Ashtamudi fishing community, World Wildlife Fund, scientists from the Central Marine Fisheries Research Institute and the Department of Fisheries, Kerala, has successfully helped in replenishing stocks thus maintaining an aquatic balance, resulting in a steady catch of 10,000 tonne annually.

The sustainable methods of fishing used by the Ashtamudi community resulted in the MSC certification, the first such certification in India, and third in Asia. As David Agnew, MSC standards director, said, "It will be an important addition to the growing number of developing world fisheries that are demonstrating their sustainability through MSC's certification programme."

The MSC certification program not only opens up new avenues of markets, but leads to conservation, sustainability of aquatic life, whilst providing greater economic returns.

The Sindhudurg community in Maharashtra too is moving towards sustainable fishing practices, where 300 trawlers have adopted square mesh nets due to which there is lesser by-catch (which results in incidental catch of non-target species) and the aquatic life is preserved. However they still have yet to obtain an MSC certification, which is compliant to internationally recognized standards on sustainable fishing and sea-food traceability.

Through research of catch records and stock surveys, fisheries can respond to depleting fish stocks by reducing fishing activities. The environmental impact can be minimized by reducing by-catch through modification of fishing techniques like the Sindhudurg community in Maharashtra adopting square mesh nets.

The end of the line

With fishing contributing to 10% of total exports from India, and almost 20% of agricultural exports, there is still a long way to go for India to completely adopt sustainable fishing practices and obtain more MSC certifications for the country.

The onus is not only on the supply side, but also demand, where the consumers too should be accountable for the fish they purchase and know how it is sourced.

Information dissemination and knowledge transfer is key to move towards a

sustainable fishing industry and for conservation of aquatic life. Otherwise a 'tragedy of the commons' is due if efforts are not made towards sustainability.

Till then, be careful what you 'fish' for.



Associated Press

June 3, 2017

Indian fishermen try new nets for healthier oceans

By VINEETA DEEPAK



SINDHUDURG, India (AP) — The fishermen were dubious when ocean experts suggested they could save their dwindling marine stocks just by switching to new nets.

It took years for the U.N. Development Program to convince the fishing communities along India's tropical western coast that the diamond-mesh nets they were using were trapping baby fish, while a square-shaped mesh could allow small fish to escape to maintain a breeding population. But two years after the new nets were fully adopted, fishermen insist they're making a difference.

"This square net is a blessing for us," said John Gabriel Naronha, who runs six trawlers in the area. "When the small fish grows up, the fishermen can really benefit ... we can get good prices for big fish. And the small fish gets a chance to grow."

The project, launched in 2011, is one of many being showcased at a major conference on oceans beginning Monday, where the United Nations will plead with nations to help halt a

global assault on marine life and ecosystems that is threatening jobs, economies and even human lives.

“The oceans of the planet are in dire need of urgent action,” said Marina Walter, deputy director for UNDP in India. That action is even more urgent now that climate change is causing ocean temperatures to rise while waters also become more acidic, causing widespread destruction of coral reefs that sustain a quarter of all marine species.

But conservation efforts work best when they’re linked with local livelihoods, Walter said. “You cannot work on biodiversity or life underwater in isolation, without looking at the livelihoods of people, the bread and butter.”

No one in 80 or so fishing villages of Sindhudurg district expected to have problems fishing, after centuries of their families relying on the sea. Located in one of India’s 11 ecologically critical coastline habitats, the area is teeming with life from more than 350 marine species including Indian Ocean dolphins and Olive Ridley turtles. Colorful corals span the shallows, while tangles of mangrove forests protect the land from water erosion.

But that bounty has suffered against the twin assaults of overfishing and pollution, which caused a steady decline local fish stocks and forced fishermen to push further out to sea.

Since switching to new nets, fishermen say fish stocks are recovering, though there is no data collected yet to prove it. Surveys of fish population may be conducted at the end of this year, when the UNDP finishes its six-year project in the area.

The struggles of India’s fishermen are hardly unique. About one out of every 10 people in the world relies directly on the ocean to survive. Most of those are among the world’s poorest and most vulnerable, meaning they have few substitutes when marine life declines.

And it is declining rapidly, thanks to increased fishing for an expanding global population and unchecked runoff of industrial chemicals, sewage and other pollutants. Already, about 90 percent of wild fisheries around the world are over-exploited or collapsed.

Meanwhile, the UNDP has also helped set up a crab farming project in the Sindudurg area to encourage local preservation of the mangroves and resistance to land developers and those gathering firewood from chopping the saltwater-tolerant trees down.

Now, nurseries for crab seedlings line up along a 2-acre (8,000-square-meter) stretch of backwater pools filled with the mud that crabs like to dig into. It takes up to nine months for the crabs to grow to full size, at which point they are harvested and sold for about \$15 per kilogram (\$6.80 a pound).

Recently, the group of nine women and one man earned nearly \$1,000 in profits from a single harvest.

Local officials are delighted with the low-fuss process and positive results.

“With very little manipulation of the environment, you can grow crabs wherever you have mangroves,” said N. Vasudevan, who heads a special unit dedicated to mangrove conservation for the government of India’s western state of Maharashtra.

This article was used by media nationally as well as internationally.



The Hindu

June 12, 2017

Coral rehabilitation to deal with climate change threat

STAFF REPORTER

Eight acres of degraded reef area in Gulf of Mannar rehabilitated

Coral rehabilitation is an effective adaptive mechanism to cope with the impact of climate change and to restore the eco-system service through resilience. This was evidenced from the comparatively less coral mortality at Thoothukudi coast during the coral bleaching event in 2016, according to J.K. Patterson Edward, Director, Suganthi Devadason Marine Research Institute (SDMRI), Thoothukudi.

Out of the total 110 sq km reef area, about 30 sq km has been degraded due to anthropogenic and natural factors, especially due to climate change, Mr Edward pointed out. Though coral mining stopped completely in 2005, there was an increase of live coral cover in the degraded areas thereafter. However, climate change impact caused coral bleaching and mortality and led to loss of habitat and biodiversity including migration of fish. The elevated temperature due to climate change in 2010 caused mortality of about 9.9% live corals in the Gulf of Mannar (GoM), but the rehabilitation of corals mainly helped in the revival with plenty of new coral recruits and, hence, live coral cover increased to 39% in 2015.

In the subsequent year, the GoM lost 16.2% live corals in 2016 due to coral bleaching. Almost 90% mortality was recorded on the fast growing coral genera *Acropora*, *Montipora* and *Pocillopora*. They were the most affected

with severe mortality, while boulders including genera Porites, Favia and Favites were found resistant to the bleaching. Mortality was higher in Mandapam group of Islands (22.17 percent), followed by Keelakarai group (17.15 percent) and Thoothukudi group (9.19 percent) during 2016. But in 2017, there was no bleaching and the affected corals were recovering slowly, he told The Hindu here on Sunday.

In 2002, coral rehabilitation was first initiated by SDMRI with the support of the Ministry of Environment, Forest and Climate Change at Thoothukudi coast. The researchers successfully standardized and field tested the low cost and low tech transplantation technique using artificial substrates like cement frames and multipurpose fish houses with native coral species. So far, over eight acres of degraded reef area at various islands, including Vaan, Koswari, Vilanguchalli, Kariyachalli, Puluvinichalli, Shingle and Poomarichan in GoM, had been successfully rehabilitated, he said. Following the GoM, Maharashtra also took up the coral rehabilitation at Malvan coast through UNDP-GEF Sindhudurg project with the technical expertise from SDMRI, he said.

Maharashtra government, Mumbai experts rehabilitate 2,620 corals off Indian coast

Mumbai city news: On world ocean day, HT looks how coral reefs are threatened by rising temperatures and how we can save them.

MUMBAI Updated: Jun 16, 2017 17:04 IST

Ankita Sengupta
Hindustan Times



Dead coral reefs off the Indian coast (Sumer Verma)

The state government and an NGO in the city have been trying to protect coral reefs off the Indian coast.

While the state's focus has been on reviving the Sindhudurg corals, Reefwatch Marine Conservation has been working on those near the Andaman and Nicobar islands.

Coral reefs are considered to be rainforests of the ocean because of the wide variety of marine life they sustain. Reefs are, however, threatened by the rising ocean temperature. Global warming poses a major threat to the corals off the Indian coast.

“The rising temperature of the oceans pose a major threat to the reefs as the ideal temperature for them to survive is between 20 and 26 degrees Celsius. But, the water around the Indian subcontinent, especially the Andamans, is about 28 degrees Celsius,” said Nayantara Jain, who heads Reefwatch. “Any further rise in temperature could be a problem for corals,” she said.

Jain, who has been diving for over a decade, said that she had seen how the reefs were deteriorating.

Coral reefs are formed by a symbiotic relationship between an algae and a polyp — a creature related to the jelly fish. While the algae makes food, the polyp protects it and creates a calcium base for it to grow. Over years, this base grows in size and becomes a coral reef.

“Continuous rise in temperature damages the relationship between the algae and the polyp, which results in them breaking. As a result, the reefs, which get their colour from the algae, weaken, turn white and can die,” said Jain. “The structure shelters small marine animals, which attracts larger animals that prey on them. So, a large number of marine lives depend on coral reefs,” she said.

Jain has been trying to encourage and speed up the growth of reefs off the Indian coast. She and members of Reefwatch rescue broken pieces of coral reefs and restore them to a point, from which they can grow again.

“These fragments can grow back if replanted and taken care of,” said Jain. This, however, is not the only way to protect the reefs.

The Maharashtra government’s mangrove cell and United Nations Development Programme (UNDP) have in three years successfully rehabilitated 2,620 coral fragments off the Malvan coast in Sindhudurg. This was an attempt to revive and facilitate growth of corals and formation of coral reefs.

“We have been using coral fragments from donor colonies to increase their numbers in Sindhudurg,” said Rohit Sawant, project management specialist and marine biologist.

The corals were transplanted in two phases — in December 2015 and April this year — and all of them are growing healthily, said Sawant.

“We take the fragments and attach them to concrete frames with the help of nylon threads. We leave it on ocean beds, at a depth suitable for its growth. Each frame holds about 10 corals,” he said. Around 3,200 coral fragments have been cultivated under the programme so far.

Even though corals grow at the rate of 1.5cm per year, the officials have already seen positive developments already. “The ones rehabilitated in the first phase have developed growth rings. They are similar to the rings that we see on tree barks that indicate their age. This also means

that the corals have adapted to the environment and are growing healthily” said Sawant. The project was funded by Global Environment Facility.

Suganthi Devadason Marine Research Institute (SDMRI) in Tamil Nadu has been helping the project with their expertise as they have been rehabilitating corals since 2002.

“During our attempts, we realised that rehabilitated corals survive only if they are taken from healthy colonies,” said JK Patterson Edward, director of the institute.

He also said that coral fragments taken from one place must be transplanted in another with the same environmental factors.

Speaking about the challenges that they faced, Edward said that rising ocean temperatures is a major threat to coral reefs. “The overall survival rate was over 80%, but it came down to 45% to 50% in 2010 and 2016 because of increase in ocean temperatures,” he said.

“Using concrete frames to rehabilitate corals is a low-cost but effective method. As the corals slowly try to develop into reefs, there has been an increase in the population of fish in the area,” added Edward.

However, the rehabilitated corals off the Tamil Nadu coast are thriving now and the team in Maharashtra is trying to follow their footsteps. “Though our corals in Malvan are young, we hope that they can gradually develop into reefs like the ones in Tamil Nadu,” said Sawant.

Marine scientist Vishal Bhave from BHNS which has partnered with the programme said that the next step would be to ensure that all the coral fragments survive the next 18 months. “We will monitor the corals for 18 months and in case any of them die, we will replace them,” he said.

In Vengurla, fisherwomen turn mangrove tour guides

The groups were given the two boats along with 20 life jackets by the United Nations Development Programme (UNDP) in collaboration with the Mangrove Cell, Maharashtra Forest Department.

Written by **Benita Chacko** | Mumbai | Updated: July 18, 2017 7:17 pm



Members of the women's group, Swamini, have educated themselves about the names and unique features of different species of mangroves. (Express Photo)

“*Avicennia marina*, *Avicennia officinalis*, *Sonneratia alba*, *Excoecaria agallocha*,” Shweta Hule rolls off when asked about the different kinds of mangrove species found in Vengurla in

Sindhudurg district. Hule is no botanist. She is a fisherwoman, who has educated herself about the names along with the properties and unique features of these mangroves.

Under a group called Swamini, Hule, along with nine other women from the area, take tourists in boats to see the mangroves and hear about the different species. The group were given the two boats along with 20 life jackets by the United Nations Development Programme (UNDP) in collaboration with the Mangrove Cell, Maharashtra Forest Department. “The group were given the two boats along with 20 life jackets by the UNDP in collaboration with the Mangrove Cell, Maharashtra Forest Department and funded by the Global Environment Facility.

“It was my dream to ferry tourists to the mangrove areas and show them the different species. When people from the UNDP came to meet us, I told them about it and within a year, they arranged the equipment for us,” says Hule, also the president of Swamini. Now, the women take 10 tourists in each boat during the high tide to the mangrove strip for an hour-long safari. As they row the boats, they explain the properties of each species of the tree and the importance of the mangroves, apart from pointing out different marine fauna.

“Staff from the forest department trained the women about the scientific name of mangroves and their properties. Some books were also provided to them. They already knew how to row boats and took on the job really well,” says N Vasudevan, Chief Conservator of Forests (Mangrove Cell). Charging Rs 100 per person, the women have made Rs 70,000 in just four months. The women also run a restaurant from a small shanty, where they sell seafood to the tourists. “We are currently using the money from the restaurant as investment to develop it further,” adds Hule.

While the women are making long strides towards entrepreneurial success, they continue to do their fishing activities by selling fish in the evening. “We were felicitated by the villagers on Women’s Day this year. People are recognising us for our work. Women from Malvan and Devgad visited us to see our model and implement it in their villages. Our husbands and families have also been very supportive,” says Ayesha Hule, another member of Swamini.

While the monsoon has brought a temporary halt to the mangrove safari, the women are gearing up to add more attractions when it resumes in October. They plan to start a nature trail which will include bird watching and mangrove walks, among other activities.

Malvan youth, now scuba divers, clean up coastline of ghost fish nets

Eight young men from the local fishing community in Malvan, coastal Maharashtra, having obtained scuba diving certification through a government initiative, have resolved to rid the entire Indian coastline of abandoned nets that pose a hazard to delicate marine ecosystems.

Written by **Benita Chacko** | Mumbai | Published: July 24, 2017 12:06 am



During training, the boys managed to collect 1.5 lakh square metres of abandoned fishing nets. Express

Eight young men from the local fishing community in Malvan, coastal Maharashtra, knew for years that abandoned fishing nets criss-cross the underwater area just off their village, but

never gave the subject much thought. Now, having obtained scuba diving certification through a government initiative, these boys not only spent their mandated underwater post-certification diving hours removing these ghost nets but have also resolved to rid the entire Indian coastline, starting with Maharashtra's 720-km coast, of these abandoned nets that pose a hazard to delicate marine ecosystems.

Bhushan Zuwatkar, 30, a resident of Tarkarli village in Sindhudurg district, says, "Belonging to a fishing community, I know it is my people who have left these nets in the sea. But I never realised the damage they do to the marine life underwater."

In 2016, Bhushan was one of a group of 20 local youngsters, all belonging to fishing villages in Sindhudurg district, who began undergoing scuba diving training. The training was provided by the Indian Institute of Scuba Diving and Aquatic Sports (IISDA) at Tarkarli, while the certification is from the Professional Association of Diving Instructors (PADI), an international certification body. The decision to train the youngsters as scuba divers was part of a project implemented by the Government of India in collaboration with the United Nations Development Programme (UNDP) and the mangrove cell of the Maharashtra forest department, with the aim of skilling the local community for tourism-related employment.

"Currently all tourist activities are concentrated around Malvan, an area rich in corals. So to divert the concentration of tourists, we identified four other locations. We trained the local youth so that they could contribute in the development of these areas," says N Vasudevan, Additional Principal Chief Conservator of Forest (CCF) in charge of the mangrove cell.

With support from an NGO called the Global Environment Facility, the 20 youth, including one girl, underwent the course, paying Rs 50,000 each for a course that costs Rs 2 lakh. The mangrove cell paid Rs 1 lakh while the Maharashtra Tourism Development Corporation (MTDC), which runs the institute, waived the remaining sum. After completion of the course, the students were mandated to complete 60 diving hours. During this, they were instructed to remove 'ghost fishing nets' from the sea. These nets are abandoned by fishermen and remain in the sea for years.

"Often, turtles, fish or other marine creatures get trapped in these nets and hurt themselves while struggling to get out. If they do not manage to free themselves they end up dying of starvation. We asked the students to use their diving hours to help us remove these nets and they managed to collect 1.5 lakh square metres of abandoned fishing nets," says Vasudevan. Bhushan and seven others were so inspired by their success in those 60 hours of diving that they decided to take their assignment further.

While the others in their batch of 20 hope to become scuba guides for tourists, these eight want to focus on the problem of ghost nets. “It is during the course that we realised how much harm these fishing nets and plastic waste is doing to the marine ecosystem in the sea. While all of us got jobs as scuba divers with private groups we knew our call was in working to preserve the marine life. I even rejected an offer from the Andamans, instead staying with this group and its commitment,” says Bhushan.

They began their independent cleaning of the underwater area behind the Sindhudurg Fort in April. With the onset of monsoon, they have had to restrict their work to beach cleaning activities. Bhushan feels the government should crack down on gutka and plastic bag manufacturers to curb the menace of littering. “In all the litter we collect we find gutka packets and plastic covers to be the most predominant. Instead of harassing the sellers the government should put an end to their manufacture,” he adds.

Beginning with Maharashtra, Bhushan eventually wants to clean the entire coastal waters of the country, but are currently struggling to raise funds for the effort. As underwater cleaning is an expensive affair they need support from a funding agency to sustain their project. For now, the eight are struggling to even raise the small sum they need to get registered as a Non-Governmental Organisation (NGO), though they have a name and plan ready for the proposed Indian Scuba Diver and Aquatic Life Saving Foundation, Malvan.

“The equipment needed are expensive and we are currently renting them. In the last four months we have spent over Rs 16,000 from our own pockets to conduct these activities. To register as an NGO we require at least Rs 6,000 and currently we do not have it. In the monsoon we have no source of income with both our fishing activity and tourism taking a hit,” he rues, adding that they are currently looking for various agencies who may be interested in partnering with them.

Meanwhile, Harshali Manjrekar, the solitary girl among the 20 youngsters in Sindhudurg who underwent scuba diving training last year, is basking in the success of being the first girl from a fishing community in Maharashtra to be a certified professional scuba diver. “After I completed the training I joined MTDC as a diving master and I now assist women tourists who visit Sindhudurg district for scuba diving. When I find time I also join the boys in the beach cleaning activities,” says Harshali.

Fisherwomen in Vengurla gear up for English speaking lessons; say it will boost ecotourism

BENITA CHACKO

MUMBAI, OCTOBER 8

EARLIER THIS year, fisherwomen in Vengurla led ecotourism efforts in the Sindhudurg district by becoming guides to tourists who came to see mangroves. Now, they are expanding their profile by learning English language skills, which, they believe, will help them cater to foreign tourists.

10 women, under a group called Swamini, take tourists in boats to see the mangroves and explain to them the properties of each tree and their importance.

The boats, along with 20 life jackets, were provided to them under the UNDP Sindhudurg Project, funded by the Global Environment Facility (GEF). The Project is being implemented by the Mangrove Cell of the Maharashtra Forest Department.

"The area is visited by several foreign tourists and the women found it difficult to communicate with them. They approached us for help to get training for English speaking skills," said N Vasudevan, Additional Principal Chief Conservator of Forests, Mangrove Cell.

The women will be taught by

two teachers from the local Balasaheb Khardekar college for three months. Set to begin after Diwali, the classes will be held four times a week. For the 48 sessions, the project will be pumping in a sum of Rs 25,000.

The women, many of whom are graduates, have studied in the Marathi medium. They believe learning English will give their business a fresh boost.

"I understand English but am unable to answer questions. Some of our women fail to understand also. So we requested the authorities to provide us training. If we learn the basics, then we will not

only know how to deal with the tourists better but it will also improve our lives," said Shweta Hule, a B.Com graduate.

Hule, along with the other women, is excited to get back to learning after so many years. "There is a different joy to it. It will be like going back to our carefree college days," she added.

Their language skills will be put to the test in March when the women plan to organise a boating competition for women in the district on Women's Day. "Many foreign tourists visit us during the time and it will be like an examination for us," said Hule.





The Wire

October 28, 2017

How Life Came a Full Circle for the Snakes That Call the Ocean Their Home

BY [CHETAN RAO](#) ON [28/10/201](#)

But as anthropogenic pressures on them increase, we lose opportunities to understand these remarkable animals in ways that we cannot imagine.



A beaked sea snake. Source: YouTube

Chetan Rao is a research assistant at the Dakshin Foundation, Bengaluru, with a research focus on the ecology of reptiles, particularly snakes.

“*Ek milala aahe* [we’ve got one],” says Santosh in Marathi as he points at his net. I am looking at the animal of my research interest, a sea snake. This one in particular

is called the beaked sea snake (*Hydrophis schistosus*). Santosh, like the other fishermen, has been helping me find this elusive animal.

My tryst with sea snakes began a year ago, when we chose the coastal fishing town of Malvan, Maharashtra, for fieldwork. Our study was a collaboration between the Dakshin Foundation, Bengaluru, and the Maharashtra State Forest Department under the UNDP-GoI-GEF Sindhudurg project. It was to investigate the by-catch of sea snakes during regular fishing operations.

Areas around Malvan have beautiful seascapes pocked with large mangrove tracts, rivers and even corals in some places. The place also witnesses a lot of fishing with vessels, which unintentionally catch sea snakes in sizeable numbers. The Indian coastline is 7,500 km long, with amazing diversity in marine habitats. These habitats harbour between 22 and 25 species of these marine serpents. However, our year-long study revealed two species of sea snakes that frequently get caught in fishing nets in Malvan: the beaked sea snake (*H. schistosus*) and the spine-bellied sea snake (*Hydrophis curtus*). These findings match with studies conducted along the Goan coast in 2003 and 2009. However, few individuals of the spine-bellied sea snake were found in our study. They seemed to die frequently when caught in the nets, which is likely resulting in a declining population because they seemed to predominate the catch 10 years ago.

These two species are widespread, their habitats ranging from East Africa to Australia, with interesting life histories. Most of their time is spent underwater foraging for their favourite food: fish, including those prized by humans for their commercial value, like sardines, groupers and sole fishes. The beaked sea snake is a habitat generalist: it inhabits mangrove forests and is also found upstream of rivers. On the other hand, the spine-bellied sea snake is a dietary generalist, rarely venturing out of the sea but remaining close to the shoreline.

Being predators, they feed on various herbivorous marine fauna and control their populations, thus preventing plankton from being over-consumed. This way, the ecosystem remains in good health. If all the fish consumed plankton without such controls, the ecosystem might crash, adversely affecting fishermen because they would be faced with depleted fish stocks. Sea snakes feed on a wide range of marine prey, from large moray eels to fish eggs.

Understanding sea snakes

If you think snakes lived only on land, think again. Life has come a full circle for a particular group of snakes that call the ocean their home. This is intriguing because sea snakes diversified mostly within the Indian Ocean; only one species moved over to the Pacific. Three major families of snakes inhabit marine ecosystems from the Persian Gulf to Australia: the Homalopsidae, Acrochordidae and Elapidae. Sea snakes fall within the Elapidae family, under two subfamilies: Laticaudinae and Hydrophiinae. The Laticaudinae are the sea kraits while the Hydrophiinae are considered to be the 'true' sea snakes because their entire life is spent underwater.

Sea kraits are egg-laying and frequently come on land to find a mate, rest or find a nesting site.

Studies have revealed fascinating insights into their biology and adaptation to sea life. These animals are marvellous engineers and have undergone some remarkable physical adaptations to survive under water. Sea snakes possess an elongated lung, flat oar-shaped tails, subcutaneous respiration (they breathe through their skin like amphibians) and scales that have tiny structures called sensory sensilla to help them *feel* their environment.

A team of researchers from the school of biological sciences at the University of Adelaide found in 2013 that sea snakes are a rapidly evolving group of marine snakes. Their ancestral source was Australasian, and the ancestor is thought to have first appeared around 6.9 million years ago.

Sea snakes seem to have undergone rapid speciation to become extremely diverse within a short span of time. There are about 75 known species reported from a region that scientists call the Indo-Australian archipelago, a marine biodiversity hotspot. A bulk of this diversity occurs in Southeast Asia and Australia. These studies have also revealed that the South and Southeast Asian populations of some widely distributed species are genetically distinct, making them interesting models for evolutionary studies.

Threats to sea snakes

Sea snakes are one of the most visible by-catch – catch with no commercial value – in fishing nets wherever they are abundant. As they hunt fish, they seem to get caught in large numbers themselves. This brings them in direct contact with fishermen. The snakes are highly venomous and often have to be physically removed from the net, so they are often perceived as pests or nuisance. They are also killed by stress and/or when they drown (being air-breathers, sea snakes have to periodically surface to catch a breath before diving back inside).

A 2012 vulnerability assessment of the Great Barrier Reef threw more light on the impacts of fishing of sea snakes, with an estimated 105,000 snakes caught each year. Caught snakes often drown or get crushed in trawler nets. A local decline in the numbers of certain sea snakes has also been reported from studies along the Goan coast. Their populations are highly localised, which means the individuals from a population do not travel far from the area in which they are born, making them vulnerable to local fishing pressures. However, with continued mortality, populations crash and this may have a cascading effect on their ecosystems.

Another 2013 study has revealed that “globally, 9% of sea snakes are threatened, 6% are near threatened and 34% are data-deficient categories defined by the International Union for the Conservation of Nature”. Sea snakes are also not listed by the Convention on International Trade on Endangered Species of wild fauna and

flora. And while they are protected in India under Schedule IV of the Wildlife (Protection) Act, 1972, the conservation of sea snakes is virtually non-existent in Asia. In Thailand and Vietnam, where sea snakes are harvested and have high commercial value, an accidental snakebite is treated by ingredients including rhinoceros horns, either applied directly to the wound or made into a paste and swallowed. This is an unusual connection between the sea-snake and rhino-horn trades.

These animals are also affected by pollution. An August 2017 study from Australia showed that melanism induced by industrial pollution occurs in the turtle-headed sea snake (*Emydocephalus annulatus*). In this case, individuals from a population in the polluted inshore bays of Pacific Island, New Caledonia, were completely black in colour as opposed to the white and black bands around them. This colour change was the result of arsenic and zinc pollution near snakes close to the bay.

Snakes have been on this planet for over 100 million years. During the course of their existence, they have shaped ecological communities and colonised almost every available habitat on our planet. But as anthropogenic pressures on them increase, we lose opportunities to understand these remarkable animals in ways that we cannot imagine.

Orphans in the wild: What the otter's trying to tell us about our oceans

As the once-sylvan coast of Sindhudurg is rapidly urbanised, Maharashtra's smooth-coated otters are choking on plastic waste, getting trapped in fishing nets. And they're not the only ones.

MUMBAI Updated: Jan 13, 2018 21:55 IST
Badri Chatterjee
Hindustan Times



Until about a decade ago, the beaches in Sindhudurg were pristine and sparsely populated. They are now under threat from garbage dumping, sand mining, untreated sewage and pesticide runoff.(Pratik Chorge / HT Photo)

In the pale light of dawn, eight otters swim out of their dens in search of fish. They swish down the creek, sheltered by thick mangrove trees, and arrive at the mouth of the bay. Suddenly, it's chaos.

An otter cub strays from the pack and starts to chew on a plastic bottle. Around him, milk sachets, plastic packets, thermocol and other debris bob in the water.

An adult otter starts trying to nudge the cub away from the trash, when a large fishing boat cuts between them. The screams of the cub can be heard over the chugging diesel engine. The baby has been caught in the net hanging loose from the boat.

“Chances are the cub will only be found hours later, when the fishermen unfurl their nets,” says Nagesh Daptardar, a wildlife warden in Sindhudurg, coastal Maharashtra. “They may call the local forest office, but since there are just two people manning the 80,000-hectare area of the district, the cub is usually left at the mouth of the nearest creek and may die from dehydration and fear.”

The other seven otters, meanwhile, have turned tail and headed home distraught and hungry.

Chances are, you didn't even know there were otters nesting along the Indian coast. The first study on the local otter population was completed in 2017, a first-of-its kind survey that counted 500 of the smooth-coated marine animals along the Konkan coast.

Even if they weren't classified as endangered under India's Wildlife Protection Act and as vulnerable by the International Union for Conservation of Nature, they would be in trouble here.

This stretch of coastline was, until recently, marked by pristine beaches scantily populated. The past decade has seen rapid urbanisation and industrialisation.

Plastic waste is starting to line the coast; debris from sand mining is choking the mangroves; pesticide runoff is polluting the water.

Ramdas Kokare, former Vengurla municipal council chief, estimates that about 1,500 kg of domestic waste is dumped across different creeks in the district, every day.

And it's not just otters in danger; 561 Indo-Pacific humpbacked dolphins have been counted along the Sindhudurg coast. There are also porpoises and whales in these waters.

“Owing to a lack of scientific studies along this region, we are not really aware of how many species, be it endangered, vulnerable, or nearly threatened, exist in these areas. The threats identified based on impact visible along our coasts, and they represent a fraction of what is happening in our oceans,” says E Vivekanandan, scientist and marine biologist at the Central Marine Fisheries Research Institute.

Even given its vast and unfathomable scale, there are resources available for the study of marine ecosystems. “But a lack of intent from governments means that there isn't the

necessary funding or deputing of dedicated scientists for such study. This has led to a vacuum of information, understanding, and effective conservation,” says Arnab Das, a former commander with the Indian Navy and director of the Maritime Research Centre of the Indian Maritime Foundation.

“While there are no studies on light pollution, various studies related to noise pollution carried out by us revealed that seismic surveys to search for oil or shipping noise over 200 decibels could lead to instant death for marine species. We have also studied the effects of oil pollution on the surface of creeks and on the ocean floor, and found it to be a major cause of mammal deaths along the western coast.”

In Sindhudurg, already the pollution is shrinking mangrove cover, taking away a source of shelter and food, shrinking hunting grounds and forcing marine species further and further outside their territories in search of fish, says Satish Pande, a marine scientist and director of the Ela Foundation in Pune, which conducted the otter survey.

Parts of the coastline should be made sacrosanct, scientists say. “Similar to what has been done in Thane, where a flamingo sanctuary has been created to protect those migratory birds, areas along the Konkan coastline need to get protection status. It is the only way to safeguard these ecosystems,” says Vivekanandan.

Instead, there is a massive plan to develop the coast as a tourism hub.

HT travelled down 90km of the 120-km coastline of Sindhudurg, across eight of the 12 creeks, tracking the threats across three talukas – Devgad, Malvan and Vengurla.

Sand mining was changing fish feeding patterns and depositing layers of sand on mangroves. Diesel from the fishing boats’ engines coated the water; trawlers with large nets like the one that trapped the baby otter had, just recently, also trapped a sawfish and a whale shark, both needless casualties, and both protected species.

“These trawlers are unregulated,” says wildlife warden Nagesh Daptardar. “We have highlighted this issue to the state government.”

The mining and garbage issues particularly are choking mangroves, says Satish Pande of the Ela Foundation.

Across the 12 creeks, boats mine sand daily for use at construction sites across Maharashtra, Goa and Gujarat. The mining is based on permits granted three years ago, even though such mining is, under Coastal Regulation Zone rules, supposed to be monitored closely by the Maharashtra Maritime Board (MMB) and the district collector.

Illegal sand mining has been listed as a major environmental concern across 70% of the world’s beaches, according to the United Nations Environment Programme. It contributes to major land erosion, affecting marine ecosystems and tide patterns.

Asked about the mining observed in the Sindhudurg creeks, district collector Uday Chaudhari said a total of Rs 1 crore in fines and revenue was collected from sand mining from across the district over the past year.

“It is banned for commercial purposes, and beach sand mining is not allowed at all,” he added. “We are aware about threats of sand mining and have been receiving four or five complaints every month for the past two years. We are taking all possible measures to protect the biodiversity. However, our department is only authorized to collect revenue for mining purposes on behalf of the state government. If there are any illegal activities taking place in the ecologically sensitive areas, the respective departments that issues permissions are responsible for taking care of this, be it the forest department or the MMB.”

MMB officials passed the buck back to the collector’s office. “We do not issue any jurisdiction over the activity of sand mining. We are a technical agency that only identifies how much sand is available to be dredged and issues a no-objection certificate for the same. Beyond this, it is the state environment department and the district collector’s prerogative to issue permissions for mining or dredging,” said Vikram Kumar, chief executive officer, MMB. “We conduct hydrographic surveys and ensure minimal sand is removed from locations so that the coastal ecosystem is not affected.”

One priority multiple departments of the government seem to agree on is tourism development.

At relatively high-footfall attractions such as the Vijaydurg fort and Tarkarli beach have seen numbers rise from 3.5 lakh a year in 2008 to 13 lakh in 2017.

KEY THREATS

- Untreated sewage, domestic waste and garbage from growing towns and cities
- Fishing boats and trawlers with diesel engines causing oil pollution
- Chemical pesticides used by farmers
- Rampant sand mining choking mangroves and disturbing marine ecosystems
- Noise pollution from ships, cargo vessels and trawlers, including sonar waves. They can have impacts that range from discomfort to internal injuries, bleeding and haemorrhaging.
- Climate change and rising sea levels as a result of rising levels of atmospheric carbon dioxide.

POSSIBLE SOLUTIONS

- As a first step, marine scientists say Maharashtra must demarcate marine sanctuaries and protected areas
- Laws that stipulate penalties and jail time for overfishing, illegal sand mining, and dumping of debris or waste on mangroves need to be strictly enforced
- A good start would be the enforcement of rules for urban waste segregation and treatment at source

- More dedicated resources are needed for the patrolling and study of these ecosystems, so there is more research, a greater focus on conservation, and the capability to act on findings and regulations



There is now a proposal to boost this further, by encouraging the construction of hotels, promenades and recreational facilities that include water sports.

Tarkarli is considered a role model in this respect. Hundreds throng here every weekend; thousands on public holidays. On offer along the coast is a cocktail of water sports such as parasailing, jet-skiing, kayaking, speed-boating (with the option of dolphin-spotting) and scuba-diving. For the state-appointed protectors of wildlife, like wildlife warden Nagesh Daptardar, this is cause for alarm.

“The negative impact of tourism is clearly visible in this area, with the diving activity directly affecting corals and underwater life. Noise pollution from boats and jet-skis is pushing

mammals like the otter deeper into the mangroves, and since there is no focused monitoring of these activities, the inflow of trash has increased manifold,” Daptardar says.

The Maharashtra Tourism Development Corporation responded to questions by saying the Sindhudurg coastline had the potential to become an international tourism destination. “With an increase in tourist inflow, there will be an increase in revenue, which will automatically help boost conservation efforts and protect the rich biodiversity in this area in the coming decades,” said MTDC managing director Vijay Waghmare. “We have tied up with the local public works department to ensure better connectivity of roads so that alternative tourism destinations that are currently unexplored are opened up and the tourist population is evenly distributed.”

With Goa less than 30km away from Shiroda, the southernmost beach in Sindhudurg, locals are excited by the idea that it could take just five years for this coastline to become contiguous with that party state’s.

Marine specialists point out that each coastal district in Maharashtra should instead be setting up a dedicated cell to protect these delicately balanced ecosystems. “The central government needs to make it mandatory for all coastal states to depute regional scientists to take stock of all marine species and document their deaths, as is done for territorial wildlife,” says Das of the Indian Maritime Foundation. “State departments also need to coordinate with each other to regulate and control tourism and other environmental threats. Areas need to be demarcated as marine sanctuaries. And these efforts need to be undertaken as soon as possible, before such native species are decimated beyond recovery.”

A UNDP effort aims to marry conservation, livelihood in Sindhudurg

The answer lies in making it profitable to protect biodiversity; better agriculture, eco-tourism and fish-farming will help, says project management specialist Durga Thigale.

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Badri Chatterjee
Hindustan Times



Protecting the mangroves is key, say UNDP officials. And currently these crucial marine habitats are under threat from rampant and illegal sand-mining and overfishing. (Pratik Chorge / HT Photo)

Around 8am every day, nine women aged 27 to 55 clamber onto two boats and head to the Mandvi creek in Vengurla, Sindhudurg. The area is home to 45 otters, spread across two dens. The two groups take tourists along a 300-metre stretch on one-hour boat rides, talking to them not just about the marine life but also about the mangroves they depend on. As the tour proceeds, the women use pointed sticks to clear garbage from the mangrove roots.

These women are part of the Swamini Mahila Bachat Gat, constituted as one of 60 projects in the district that aim to tackle the garbage issue threatening the biodiversity of Sindhudurg's creeks.

“We have been trained to speak in English and Hindi. We received hospitality training and also learnt about different mangrove species, when they flower, their medicinal benefits etc,” said Shweta Hule. “We know how trash coming from cities within the district through the creek chokes the breathing roots of these mangrove trees, and why it is essential to remove it and protect this area.”

The 60 programmes are livelihood schemes framed by the state mangrove cell in association with the UNDP-GEF (United Nations Development Programme - Global Environment Facility) Project between 2012 and 2016, based on a study of the coastal ecosystem and the threats it faces.

Sindhudurg accounts for 3% of Maharashtra's total mangrove cover but houses more of its coastal biodiversity than any other district in the state.

“In view of existing and potential threats to the mangrove ecosystem, there is an urgent need for an integrated approach towards conservation of mangroves, its associated diversity and the sustainable use of natural resources towards livelihood,” says Rohit Sawant, project management specialist for the UNDP-GEF project.

Macro projects undertaken include turtle conservation, mangrove plantation, single-seed technology to curb weeding and a system of rice-intensification to control pesticide pollution, training for locals on sustainability in the fishing sector, and scuba-diving and snorkelling training for forest officers so they understand the marine ecosystem better.

Studies have been done to identify cetacean and other aquatic species, environmental variables and anthropogenic pressures such as depth, salinity, distance from shore and distance from nearest freshwater source, and the impact of fishing boat traffic.

At the macro level, livelihood schemes such as crab farming, oyster and mussel culture, integrated multi-trophic aquaculture and apiculture or bee-farming have been introduced.

Considering the environmental and economic benefits of these projects, the Government of Maharashtra has sanctioned Rs. 24 crore for the upscaling of these activities in the state's coastal belt.

“Our efforts have been focused towards making the agriculture, tourism and fisheries sectors more sustainable, not just through conservation, but also by effectively demonstrating the organic link between biodiversity conservation and income generation,” says Durga Thigale, project management specialist for the UNDP-GEF project.

Maharashtra government officials say they are developing 'mangrove co-management committees' where coastal residents will be trained to rescue beached mammals. "The human population expansion is slowly threatening areas dominated by species that we are not aware about," says N Vasudevan, additional principal chief conservator of forests and head of the state mangrove cell. "We have tied up with various government institutions to conduct studies and understand these threats more closely."

As part of the National Wildlife Action Plan 2017-2031 released in October, the union environment ministry has come up with a list of guidelines to protect the inland aquatic, coastal and marine ecosystems.

"This had never been done before," says Vasudevan, adding that the onus is now on state governments to implement it. "There is a need for interventions that address specific threats along India's coastline and we have only addressed a minuscule portion of the problem in Sindhudurg. The need of the hour is to escalate this country-wide."

‘Marine biodiversity conservation needs to be improved in the country’

Meet N Vasudevan, an IFS officer with a Masters in marine biology and head of Maharashtra’s mangrove cell.

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‘Sindhudurg has, by far, the richest marine biodiversity in Maharashtra. Among the richest in the country,’ says N Vasudevan. (Pratik Chorge / HT Photo)

N Vasudevan is additional principal chief conservator of forests and state nodal officer for all marine biodiversity conservation projects under the United Nations Development Programme (UNDP). He has a Masters in marine biology. And he heads Maharashtra's mangrove cell, tasked with protecting the mangrove ecosystem and marine biodiversity. We talked to him about exactly what needs to change, and what his department needs in order to make that happen.

What are the biggest threats faced by our marine ecosystems, in your opinion?

The problems along the coastline are not exclusive to Maharashtra, but apply across the country's coastlines. The invasion of plastic and other solid waste are a key concern. Terrestrial activities like sand mining and watersports. Tourism in general... because it is a revenue-driven sector, there is not much sensitivity towards conservation.

There is also pesticide runoff from fields; and overfishing — accidental or deliberate.

There are apparently only two forest guards manning 80,000 hectares along the coast. Shouldn't there be more?

The forest department needs to strengthen its assets. The department's mandate is to protect wildlife. There is a need to train people better so they have a better understanding of how to do this. This is being addressed. We plan to recruit more people, train them in species recognition and even scuba-diving and snorkelling to understand marine wildlife better too.

There's a much sharper focus on terrestrial wildlife conservation in India. That kind of focus is missing when it comes to marine habitats. Does this blind-spot effect concern you?

Marine biodiversity conservation needs to be improved in our country. The ideas are there but they're still at a nascent state. Sindhudurg has, by far, the richest marine biodiversity in Maharashtra. Among the richest in the country. So our focus along the coastline has always been there. Clean-ups have been conducted across 30 beaches in Sindhudurg — at least three times by us and then by the maritime board. Now locals do it every month because we have been able to inculcate in them a sense of the importance of the exercise.

So what's next for marine conservation along the Sindhudurg coast?

We are carrying out studies on the types of marine animals here. We have studied corals, categorised and mapped them. We have done the same for dolphins and crustaceans, and conducted studies on how to protect them. We have plans for three marine mammal rescue centres in the district.

What about local and inter-departmental involvement in these efforts?

There is a need to segregate waste at the panchayat level. That is not in place yet but we are working with the clusters that do segregate waste. Soon, that will improve across the coastline. Conservation is not limited to a particular sector. There is need for a mainstreaming of biodiversity conservation across sectors, and see how local species can be protected. Involve locals, corporations, fishermen, tourism companies and hotels. Then we can look at it from the policy level.



Fishers successfully farm crabs in estuaries, protect mangroves

Many coastal communities in Maharashtra's Sindhudurg district have turned protectors of mangroves because they are earning supplementary incomes by farming crabs in estuaries with help from the state government and development agencies

Hiren Kumar Bose • Jan 15, 2018 • Sindhudurg, Maharashtra



Mangrove crab farming has emerged as a lucrative option for Sindhudurg fishing communities. (Photo by Prashanth Vishwanathan/UNDP India)

Cruising the Arabian Sea's azure waters fringed by green mangroves on the 121 km long coastline beginning with the coastal village of Vijaydurg to Shiroda in Sindhudurg district of Maharashtra, one can see fishing nets supported by long bamboo poles amidst the mangroves. The nets and poles stand testimony to crab farming, the local fisher folks' newfound livelihood.

Rapid development has put enormous pressure on the coastal ecosystems, leading to degradation and destruction. Mangroves are no exception. Till recently, mangroves were considered to be of no economic importance. They were uprooted or felled and used as fuel wood.

But that is changing, thanks to the growing awareness about the importance of *kharpit*, as mangroves are known locally among the coastal communities. Government and development institutions have been broadening the awareness by introducing crab farming in mangroves.

Mangrove status

Mangroves are groups of plants that survive in sheltered brackish water habitats along coasts. They are known to be the breeding grounds and habitat for a variety of marine organisms and act as shoreline protectors. Acting as a biological barrier between land and the ocean, they maintain the ecological balance of the coastal environment and protect coastal communities from nature's fury. The latter was evident after the tsunami of 2004, when villages that had mangroves suffered only minimal damage.

The 5,700 km long Indian coastline on the east covers maritime states like Tamil Nadu, Andhra Pradesh, Orissa, West Bengal and Andaman & Nicobar Islands. The west coast encompasses Kerala, Karnataka, Goa, Maharashtra and Gujarat, and includes the coral atolls of Lakshadweep Islands.

The total mangrove area along the Indian coast is estimated to be approximately 4,628 sq. km, the majority of it garlanding the east coast. The mangrove area in Maharashtra coast is only 186 sq. km. The decline and further degradation of the mangroves continue due to extremely dry climate, weakening monsoon trends and development pressures.

Capitalizing awareness

Coastal communities do understand the importance of mangroves. "We have come to realize that *kharpit* forms a very important link in the marine food chain and helps recycle nutrients in coastal waters," Shweta Hule, an entrepreneur in her mid-50s who organizes mangrove safaris in the backwaters of Vengurla coast, told VillageSquare.in.

Fisherman Narayan Vishnu Kubal (47) of Achra village, expressed similar sentiments, "Mangroves are important nursery and feeding habitats for many marine and coastal species and a major source of food and income for us."

Utilizing such awareness, UNDP Global Environmental Finance initiated a 4-year-long mangrove crab farming in 2011 in 17 villages of Sindhudurg district, spread across 28.5 acres, to encourage the local people conserve mangroves. Known for its beautiful beaches, backwaters, temples, historical forts and folk art forms, Sindhudurg, at 338 km south of Mumbai, has a unique coastal and marine biodiversity. The selected villages are spread across Malvan, Devgad and Vengurla administrative blocks of Sindhudurg.

The program facilitated the fisher folk from these villages go on aquaculture related institutional tours, get financial grants, form of self-help groups (SHGs), and set up pens, besides providing them with baby crabs, also known as crablets.

Dual advantage

"What makes the crab farming in Sindhudurg different is that it is being promoted by the government less as a commercial venture and more to ensure conservation of mangroves," N. Vasudevan, Additional Chief Conservator of Forests (APCCF), Mangrove Cell, and nodal officer of Government of India-UNDP-GEF Sindhudurg Project, told VillageSquare.in.

Found in estuaries, backwaters and coastal areas, mud crab or green crab (*Scylla serrata*) has always been in demand. According to marine biologist Arvind Untawale of Mangrove Society of India, till recently, fisher folk armed with long iron hooks frequented the mangroves and mud flats searching for crab holes to hunt them. "But thanks to a demand for the crabs, the fisher folk are adopting pen and pond culture," he told VillageSquare.in.

The fisher folk do not dig artificial ponds for growing crabs. Instead, they create pens in existing waters, leaving the tidal water flowing to the mangroves undisturbed. They source the crablets from a hatchery and not from the wild, as such precautions ensure optimal growth of crabs in a healthy mangrove ecosystem.

According to Vasudevan, this has created a hitherto unknown livelihood for the local community and helped underscore the importance of mangrove conservation from a practical point of view. As the crab farmers utilize the space between the mangrove shrubs, the community no longer cuts the branches for fuel wood or other purposes.

Supplementary income

The mud crablets acquired from Tamil Nadu-based Rajiv Gandhi Centre for Aquaculture are fattened in pens, floating net cages and bamboo cages in shallow estuarine waterways. SHGs comprising of 11 women own the pens. Using bamboo splits and polymer or HDPE netting material, they arrange the cages in a row so that one can easily feed and monitor the crabs, during high as well as low tides.

“Keeping the crabs in the pens for a period ranging between six and eight months and fattening them with remains of marine creatures like squid and eel increases their sizes guaranteeing us a good price,” Laxman Vitthal Tari (47) of Taramumbari in Devgad block and coordinator of all-women SHG Dirbanarayan told VillageSquare.in.

In 2016, a year after they started Dirbanarayan, the women earned around Rs 42,000, selling crabs, and the next year around Rs 83,000. While crabs weighing 1,110gm earned them Rs 1,155 each, the ones that weighed less earned them Rs 900 each. Shri Ganesh SHG of Kochar village in Vengurla block and Rameshwar SHG of Achra village in Malvan block achieved similar turnover.

“We are still learning the ropes and keeping our pens safe from attack by marine otter, eels and foxes; but we are confident that once we master it we will earn even more,” 57-year-old Rajendra Gopal Chavan of Shri Ganesh SHG told VillageSquare.in.

Looking ahead

With Maharashtra government allocating Rs 24 crore to its Mangrove and Marine Biodiversity Conservation Foundation, the foundation has decided to use a part of it to set up a crab hatchery in Sindhudurg, with the potential of producing one million crablets a year which will also ensure extending the UNDP Project to all coastal districts of Maharashtra.

According to Vasudevan, the UNDP Project has been instrumental in bringing many conservation and livelihood initiatives to the shores of Maharashtra and the same is likely to be carried forward to other coastal districts of India as well as to the rest of coastal Maharashtra.

Hiren Kumar Bose is a journalist based in Thane, Maharashtra. He doubles up as a weekend farmer.

Maharashtra is encouraging fisherfolk to conserve mangroves by introducing lucrative crab farming

As the crab farmers utilise the space between the mangrove shrubs, the community no longer cuts the branches for fuel wood or other purposes.



Mangrove crab farming has emerged as a lucrative option for Sindhudurg fishing communities. | Prashanth Vishwanathan/UNDP India

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SINDHUDURG