Nine more bird, biodiversity areas in Kerala

Nilgiri Flycatcher | Photo Credit: Dileep Anthikad

The bird and biodiversity-rich areas in Kerala are drawing global attention with nine more locations being identified as Important Bird and Biodiversity Areas (IBAs).

The newly identified IBAs of Kerala are Achencoil Forest Division; Anamudi Shola National Park; Camel's Hump Mountain, Wayanad; Kurinjimala Wildlife Sanctuary; Malayattoor Reserve Forest; Mankulam Forest Division; Mathikettan Shola National Park; Muthikulam-Siruvani; and Pampadum Shola National Park.

With the latest addition, Kerala now has 33 IBAs.

The new list was released by the Bombay Natural History Society, a partner of BirdLife International, in its recent publication, Important Bird and Biodiversity Areas in India Priority sites for conservation.

The IBAs are "places of international significance for the conservation of birds and other biodiversity" and are "distinct areas amenable to practical conservation action," according to BirdLife International.

Three species

Kerala IBAs are home to three critically endangered species — Whiterumped Vulture, Indian Vulture, and Red-headed Vulture. Studies have identified the presence of five endangered, 13 vulnerable, and 32 near-threatened bird species in the Kerala IBAs, said P.O. Nameer, Kerala State coordinator of the Indian Bird Conservation Network, a BirdLife partner, and one of the contributors for the enlistment of the areas from Kerala.

The BirdLife International had earlier listed 19 endangered species in India, out of which nine are found in Kerala, the report said.

Listing out the conservation threats faced by the IBAs, the report pointed out that anthropogenic pressure on the forests was very intense. The protection and maintenance of evergreen and semi-evergreen forests of the State were required to ensure the survival of endemic threatened species, it said.

The "birds of the low altitude evergreen forests seem to have suffered the most in Kerala, mainly due to human interventions. Species such as Malabar Pied Hornbill, a near-threatened species, has declined, along with Orange-breasted Green-pigeon," it said.

Habitat fragmentation in high altitude areas, according to conservationists, was a major cause for concern as many "species have nowhere to go. These 'sky islands' are now surrounded by tea estates or plantations, leaving very limited habitat for species such as White-bellied Blue Robin, Nilgiri Blue Robin, and Blackand-Orange Flycatcher," it said.

Chief Minister to launch insurance scheme for migrant workers today

V. J. Kurien, Managing Director of the Cochin International Airport, has been selected for this year's FACT Lalithakala Akademy's MKK Nayar Award.The

Sunderbans mangrove cover at risk - Today's Paper

Remote sensing and GIS-enabled data offer definite proof for the first time that the mangrove forest cover in the Sunderbans has been depleting alarmingly. From 1986 to 2012, 124.418 sq. km., or about 5.5% of the mangrove cover, was lost. Variable degrees of erosion was observed in at least 18 islands.

The continuation of this process is a serious ecological threat, says a study by Jadavpur University.

END

In Telangana, a unique irrigation project

If anything is at stake for the Telangana Rashtra Samithi (TRS) government in the youngest State of the country for the next elections due in 2019, it is the execution of the Kaleshwaram Lift Irrigation Project (KLIP).

Why is it important?

Claimed to be the costliest irrigation project to be taken up by any State till date with an estimated cost of Rs. 80,500 crore, the project holds the key to the TRS government's promise of providing irrigation facility to one crore acres of land under all projects/tanks. The government has already spent Rs. 10,000 crore on the project, including land acquisition, and has allocated Rs. 7,000 crore in the current budget, besides tying up a Rs. 7,400 crore loan from a consortium of banks. Notwithstanding its share of controversies, particularly related to land acquisition for the Mallannasagar reservoir, one of the key components of the project for storage of 50 tmc ft water, the project is making swift progress.

"We are working towards completing the barrages and pump houses at Medigadda, Annaram and Sundilla by December-end next year, with Chief Minister K. Chandrasekhar Rao himself monitoring the progress of works live through video streaming from the work spots with the help of high resolution cameras installed there," a senior irrigation engineer, overseeing execution of the project, said.

What's the project?

The Kaleshwaram project is an off-shoot of the original Pranahitha-Chevella Lift Irrigation Scheme taken up by the Congress government in 2007 when Andhra Pradesh was not divided. After the formation of Telangana in 2014, the TRS government redesigned the project on the ground that the original plan had too many environmental obstacles and had very low water storage provision — only about 16.5 tmc ft. After conducting a highly advanced Light Detection and Ranging (LiDAR) survey for a couple of months, the government separated the original component serving the Adilabad area as the Pranahitha project and renamed the rest as Kaleshwaram by redesigning the head works, storage capacity and the canal system based on the data of availability of water at different locations along the course of the Godavari and its tributaries.

The Kaleshwaram project has provision for the storage of about 148 tmc ft with plans of utilising 180 tmc ft by lifting at least 2 tmc ft water every day for 90 flood days.

"The project is designed to irrigate 7,38,851 hectares (over 18.47 lakh acres) uplands in the erstwhile districts of Karimnagar, Nizamabad, Warangal, Medak, Nalgonda and Ranga Reddy," the senior engineer said.

As a lot is at stake for the government, it is pursuing various clearances and permissions simultaneously with the Union Ministry of Environment and Forest and the Central Water Commission. Recently, the Ministry of Environment has given its nod for utilising 3,168 hectares (7,920 acres) of forestland, including 302 hectares in Maharashtra. The project requires a total of 32,000 hectares. Following severe opposition from a section of farmers against land acquisition for the Mallannasagar reservoir, the State amended the 2013 Land Acquisition Act to speed up the process.

What's unique?

According to engineers, KLIP has many unique features, including the longest tunnel to carry water in Asia, running up to 81 km, between the Yellampally barrage and the Mallannasagar reservoir. "The tunnel work is nearing completion and the lining work is also in progress," another engineer involved in the project said, adding that the project would also utilise the highest capacity pumps, up to 139 MW, in the country to lift water.

B. Chandrashekhar

NASA developing first asteroid deflection mission

This file computer-generated handout image taken on May 15, 2015 and released by the European Space Agency (ESA) on May 15, 2015 shows the impact of the DART (Double Asteroid Redirection Test) projectile on the binary asteroid system (65803) Didymos observed by the AIM (Asteroid Impact Mission) satellite. | Photo Credit: AFP/NASA IMAGES

NASA is developing the first-ever mission that will deflect a near-Earth asteroid, and help test the systems that will allow mankind to protect the planet from potential cosmic body impacts in the future.

The Double Asteroid Redirection Test (DART) — which is being designed and would be built and managed by the John Hopkins Applied Physics Laboratory — is moving from concept development to preliminary design phase, the US space agency said.

"DART would be NASA's first mission to demonstrate what's known as the kinetic impactor technique — striking the asteroid to shift its orbit — to defend against a potential future asteroid impact," said Lindley Johnson, planetary defense officer at NASA Headquarters in Washington.

"This approval step advances the project towards a historic test with a nonthreatening small asteroid," said Johnson.

"DART is a critical step in demonstrating we can protect our planet from a future asteroid impact," said Andy Cheng, who serves as the DART investigation co-lead.

"Since we don't know that much about their internal structure or composition, we need to perform this experiment on a real asteroid," Andy said.

"With DART, we can show how to protect Earth from an asteroid strike with a kinetic impactor by knocking the hazardous object into a different flight path that would not threaten the planet," he said.

The target for DART is an asteroid that will have a distant approach to Earth in October 2022, and then again in 2024.

The asteroid is called Didymos — Greek for "twin" — because it is an asteroid binary system that consists of two bodies: Didymos A, about 780 metres in size, and a smaller asteroid orbiting it called Didymos B, about 160 metres in size.

DART would impact only the smaller of the two bodies, Didymos B.

The Didymos system has been closely studied since 2003.

The primary body is a rocky S-type object, with composition similar to that of many asteroids. The composition of its small companion, Didymos B, is unknown, but the size is typical of asteroids that could potentially create regional effects should they impact Earth.

After launch, DART would fly to Didymos and use an APL- developed onboard autonomous targeting system to aim itself at Didymos B.

Then the refrigerator-sized spacecraft would strike the smaller body at a speed about nine times faster than a bullet, about six kilometres per second.

Earth-based observatories would be able to see the impact and the resulting change in the orbit of Didymos B around Didymos A, allowing scientists to better determine the capabilities of kinetic impact as an asteroid mitigation strategy.

The kinetic impact technique works by changing the speed of a threatening asteroid by a small fraction of its total velocity, but by doing it well before the predicted impact so that this small nudge will add up over time to a big shift of the asteroid's path away from Earth.

A study of nearly 300 people living in different parts of India found that nine single-base variants (single-nucleotide polymorphisms or SNPs) account

What is the G20 and how does it work?

The Group of Twenty (G20) is an international forum that brings together the world's 20 leading industrialised and emerging economies. The group accounts for 85 per cent of world GDP and two-thirds of its population.

Much of the important business takes place on the sidelines and in informal meetings.

Initially attendance at G20 summits was limited to the finance ministers and central bank governors of members when it was established 17 years ago.

But since an inaugural meeting between G20 leaders in Washington DC following the collapse of Lehman Brothers in 2008, summits between G20 leaders themselves have become an annual event.

The first G20 summit occurred in Berlin, in December 1999, and was hosted by the German and Canadian finance ministers.

Since then there have been 20 G20 meetings between finance ministers and central bank governors, and 11 summits between heads of state or government of G20 economies.

The next summit of G20 leaders is scheduled for Hamburg, Germany, on July 7-8 2017.

After the last summit in China, Germany assumed the G20 presidency in December 2016. Although Berlin hosted ministerial-level G20 meetings in 1999 and 2004, the Hamburg event will be the first time Germany has hosted G20 heads of government.

It's expected to be dominated by climate change discussions and it will also be Donald Trump's first meeting with Russian president Vladimir Putin since his election as US president.

Theresa May, France's Emmanuel Macron and Canada's Justin Trudeau will also be in attendance.

The G20 is made up of:

The final member is the European Union, represented by the European Commission, rotating Council presidency and the European Central Bank (ECB). Spain as a permanent non-member invitee also attends leader summits.

Other countries also attend summits at the invitation of the host country, while it has become customary for the Chair of ASEAN (Association of Southeast Asian Nations) and representatives of the African Union and NEPAD (New Partnership for Africa's Development) to be present at leader summits.

Meetings tend to occur on an annual basis; however leaders met twice a year in 2009 and 2010, when the global economy was in crisis.

Next year, Buenos Aires will host the gathering as Argentina becomes the first South American nation to host a G20.

Fearing deadlock in a larger decision-making body, not all countries are invited to the G20.

The Group of Eight (G8), established as the G7 in 1976 but renamed after the admission of Russia in 1998, is an international forum for the eight major industrial economies. It comprises: Canada, France, Germany, Italy, Japan, Russia, the United Kingdom and the United States.

However, since 2014 Russian membership has been suspended following the country's annexation of Crimea.

The G8 seeks cooperation on economic issues facing the major industrial economies, while the G20 reflects the wider interests of both developed and emerging economies.

The G20 has no permanent staff of its own and its chairmanship rotates annually between nations divided into regional groupings.

Germany currently holds the presidency, with Argentina to take over in 2018. Hosting the summit is an opportunity to set the agenda and lead discussions.

In 2009, when the UK held a special spring summit, then prime minister Gordon Brown orchestrated a deal in which world leaders agreed on a $1.1 trillion injection of financial aid into the global economy. The "historic" deal was widely viewed as a success.

There are no formal votes or resolutions on the basis of fixed voting shares or economic criteria. However, the lines of informal influence in the organisation trace those of major power politics.

Former US President Barack Obama dominated the 2014 Brisbane summit, placing climate change at the top of the agenda, despite the reluctance of host nation Australia's prime minister Tony Abbott to allow the issue such pride of place.

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governors, and 10 summits between heads of state or government of G20 economies.

The next summit of G20 leaders is scheduled for Hangzhou, China, from 4-5 September 2016. It is the first to be hosted by China, only the second in Asia, and has been hailed as a "milestone" in the country's development and symbolic of its growing importance as a major power.

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Supreme Court stays Uttarakhand high court's order declaring Ganga and Yamuna 'living entities'

NEW DELHI: The Supreme Court on Friday stayed the landmark judgement that accorded the Ganga and [Yamuna](#) rivers the status of "living human entities".

On March 20, this year, the Uttarakhand HC accorded the status of "living human entities" to the two rivers. This was to enable the "preservation and conservation of the two rivers and to protect the recognition and faith of society".

Following which the Uttarakhand government moved to the apex Court challenging the state high court order.

"Let me be very clear that we are not against according of living entity status to the two holy rivers Ganga and Yamuna," Uttarakhand minister [Madan Kaushik](#) had said in May.

He was unhappy though with the ambiguity regarding the accountability of damage done to these rivers.

"How can the chief secretary here be held accountable if the river is polluted in West Bengal, Bihar, Jharkhand or UP?" Kaushik said, adding, "We just want an opportunity to put forth our views in the SC."

In its verdict, the state high court had cited New Zealand's bill which made the Whanganui river, revered by the indigenous Maori people, the first in the world to be recognised as a living entity with full legal rights.

However, legal experts told TOI at the time that treating the rivers as "living entities" would mean that polluting the rivers would be seen as akin to harming a human being.

[Read this story in Bengali](#)

G-20 leaders propose Hamburg Action Plan at summit conclusion

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Hamburg [Germany], Jul 8 (ANI): The two-day G-20 summit that took place in Germany's Hamburg city ended with the leaders proposing the Hamburg Action Plan to address major global challenges, including climate change, harnessing digitalisation, and to contribute to prosperity and well-being.

"Mastering the challenges of our age and shaping an interconnected world is the common goal of the G-20 as our premier forum for international economic cooperation. We can achieve more together than by acting alone," an official statement read.

The leaders pledged to progress towards their joint objective in the G20, which is strong, sustainable, balanced and inclusive growth.

"We are resolved to tackle common challenges to the global community, including terrorism, displacement, poverty, hunger and health threats, job creation, climate change, energy security, and inequality including gender inequality, as a basis for sustainable development and stability," the statement read.

In order to improving sustainable livelihoods, the G-20 leaders collectively committed to mitigate greenhouse gas emissions through, among others, increased innovation on sustainable and clean energies and energy efficiency, and work towards low greenhouse-gas emission energy systems.

"In facilitating well-balanced and economically viable long-term strategies in order to transform and enhance our economies and energy systems consistent with the 2030 Agenda for Sustainable Development, G-20 members will collaborate closely," the statement read.

Taking note of its withdrawal from the Paris Peace Climate Accord, the United States of America announced that it would immediately cease the implementation of its current nationally-determined contribution and affirm its strong commitment to an approach that lowers emissions while supporting economic growth and improving energy security needs.

"The United States of America will endeavour to work closely with other countries to help them access and use fossil fuels more cleanly and efficiently and help deploy renewable and other clean energy sources, given the importance of energy access and security in their nationally-determined contributions," it said.

The Leaders of the other G-20 members also agreed that the Paris Agreement is irreversible reiterated the importance of fulfilling the UNFCCC commitment by developed countries in providing means of implementation including financial resources to assist developing countries with respect to both mitigation and adaptation actions in line with Paris outcomes.

The leaders also stressed on the importance of harnessing the benefits of globalisation, reaffirm the importance of transparency for predictable and mutually beneficial trade relations, harness digitalisation to achieve the goals of the 2030 Agenda for Sustainable Development.

Besides this, the G-20 leaders also underlined to boost employment by improving sustainable global supply chains, which have been recognised as an important source of job creation and

balanced economic growth.

The leaders also resolved to make a resilient global financial system in agreed international standards, to support sustainable growth.

"We remain committed to the finalisation and timely, full and consistent implementation of the agreed G-20 financial sector reform agenda. We will work to finalise the Basel III framework without further significantly increasing overall capital requirements across the banking sector, while promoting a level playing field," the statement said.

The G-20 leaders also called for safeguarding against health crises and strengthening health systems.

"The G-20 has a crucial role in advancing preparedness and responsiveness against global health challenges. With reference to the results of the G-20 health emergency simulation exercise, we emphasise the value of our ongoing, trust-building, cross-sectoral cooperation. We recall universal health coverage is a goal adopted in the 2030 Agenda and recognise that strong health systems are important to effectively address health crises," the statement said.

The leaders called on the United Nations to keep global health high on the political agenda and strive for cooperative action to strengthen health systems worldwide, including through developing the health workforce.

"We recognise that implementation of and compliance with the International Health Regulations (IHR 2005) is critical for efficient prevention, preparedness and response efforts. We strive to fully eradicate polio. We also acknowledge that mass movement of people can pose significant health challenges and encourage countries and International Organisations to strengthen cooperation on the topic," the statement added.

Under this, the leaders also stressed on combatting Anti-Microbial Resistance (AMR), which is a growing threat to public health and economic growth.

"To tackle the spread of AMR in humans, animals and the environment, we aim to have implementation of our National Action Plans, based on a One-Health approach, well under way by the end of 2018. We will promote the prudent use of antibiotics1 in all sectors and strive to restrict their use in veterinary medicine to therapeutic uses alone," the leaders noted.

The leader in the G-20 Summit also remained committed to fighting corruption, including through practical international cooperation and technical assistance, and will continue to fully implement the G-20 Anti-Corruption Action Plan 2017-18.

"We endorse four sets of High Level Principles aimed at fostering integrity in the public and private sector," it said. (ANI)

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END

Earth facing sixth mass extinction

Habitat loss:Gorillas are surviving on 20% or less of the land they once roamed.AFPAFP

The sixth mass extinction of life on Earth is unfolding more quickly than feared, scientists have warned.

More than 30% of animals with a backbone — fish, birds, amphibians, reptiles and mammals — are declining in both range and population, according to the first comprehensive analysis of these trends.

"This is the case of a biological annihilation occurring globally," said Stanford professor Rodolfo Dirzo, co-author of a study published on Monday in the peer-reviewed U.S. journal *Proceedings of the National Academy of Sciences* .

Around a decade ago, experts feared that a new planetary wipeout of species was looming.

Today, most agree that it is under way — but the new study suggests that the die-out is already ratcheting up a gear. It provides much-needed data about the threat to wildlife, mapping the dwindling ranges and population of 27,600 species.

For 177 mammals, researchers combed through data covering the period 1900 to 2015.

The mammal species that were monitored have lost at least a third of their original habitat, the researchers found. Forty per cent of them — including rhinos, orangutans, gorillas and many big cats — are surviving on 20% or less of the land they once roamed. The loss of biodiversity has recently accelerated.

"Several species of mammals that were relatively safe one or two decades ago are now endangered," including cheetahs, lions and giraffes, the study showed. There are as few as 20,000 lions left in the wild, less than 7,000 cheetahs, 500 to 1,000 giant pandas, and about 250 Sumatran rhinoceros.

Wide impact

Globally, the mass die-off — deemed to be the sixth in the last half-billion years — is the worst since three-quarters of life on the Earth, including the non-avian dinosaurs, were wiped out 66 million years ago by a giant meteor impact.

On an average, two vertebrate species disappear every year.

Tropical regions have seen the highest number of declining species. In South and Southeast Asia, large-bodied species of mammals have lost more than four-fifths of their historical ranges.

While fewer species are disappearing in temperate zones, the percentage is just as high or higher.

As many as half of the number of animals that once shared our planet are no longer here, a loss the authors described as "a massive erosion of the greatest biological diversity in the history of Earth".

The main drivers of wildlife decline are habitat loss, overconsumption, pollution, invasive species, disease, as well as poaching in the case of tigers, elephants, rhinos and other large animals prized

for their body parts.

Climate change is poised to become a major threat in the coming decades.

"The massive loss of populations and species reflects our lack of empathy to all the wild species that have been our companions since our origins," said lead author Gerardo Ceballos of the National Autonomous University of Mexico.

Sensor network to map and predict pollution in Godavari

The Ganga may be the focus of the government's river-cleaning efforts, but a group of U.S. researchers is working on a system to map undulating pollution trends in the Godavari, India's second longest river.

Using a mix of methods, including satellite-monitoring, traversing stretches of the river to collect water samples and using special sensors to measure bacterial and chemical pollution, the researchers are trying to develop a cost-effective forecast system.

The team's long-term objective is to be able to inform State officials and citizens of a probable spike in, say, levels of dangerous microbes or effluents, similar to weather and air pollution forecasts. That apart, said Anup Malani, Professor of the University of Chicago Law School, it is to be able to access "raw data" that could be used to inform the efficacy of a proposed faecal sludge treatment plant and whether behavioural interventions — including incentives or punishments — to restrict activities that pollute the river could actually work. "We've had debates with town planners who told us that all the pollution gets washed away… Is that true? We need to find out," Mr. Malani, who is also co-founder of the International Innovation Corps, told *The Hindu*. "That would help us know whether interventions are needed only up-river or along various stretches."

The project started eight months ago and has so far identified two "hotspots" of pollution, which Mr. Malani declined to reveal, saying he would first inform the Andhra Pradesh government about them. The sampling exercise, being done along a portion of the 1,400-km river spanning Rajamundhry (East Godavari district) and Kovvur, Narsapur and Palakol (all in West Godavari), measures parameters such as total dissolved salts, nitrate, pH, temperature, turbidity and electrical conductivity. These are relayed to a website called Thoreau, a wireless sensing network maintained at the University of Chicago to map environmental parameters, for analysis. Some river attributes such as microbial levels require to be measured in laboratories, though the team hopes eventually to be able to use low-cost sensors that measure them, too, in real time.

"Through cloud-based data collection and real-time mapping systems, the research and implementation teams intend to demonstrate the importance and value of detecting and anticipating pollutants that enter the river in the form of human waste, organic materials, and chemical contaminants," the University of Chicago research team said in a statement.

The exercise is part of a Bill and Melinda Gates Foundation project to support the programme of the Administrative Staff College of India (ASCI) to provide city-wide sanitation improvements in urban Andhra Pradesh. Sensors to monitor river pollution are an emerging technological approach in India.

In April, Ashutosh Sharma, Secretary, Department of Science and Technology (DST), said 40 proposals to make the sensors (to monitor river and environmental pollution) had come in, and two would be short-listed soon. Intel, which will make the chips powering the devices, and the DST will split a 35-crore investment.

Says BJP will campaign against corruption, law and order problems and lack of development work in Himachal Pradesh

The process of holding the requisite Board Meetings and Shareholder Meetings has been completed in phases in September 2017.

Ruben George is staying at Ram Nath Kovind's house at Kalyanpur, near Kanpur

India ranks 116 out of 157 nations on SDG index

UNITED NATIONS: India is ranked 116 out of 157 nations on a global index that assesses the performance of countries towards achieving the ambitious sustainable development goals (SDGs).

The SDG Index and Dashboards Report produced by the Sustainable Development Solutions Network (SDSN) and the Bertelsmann Stiftung shows that world leaders need to strengthen their joint efforts to realise the 17 global goals.

"Not only does a rising trend of nationalism and protectionism impede the implementation of the goals, but as the report shows, industrialised countries are not serving as role models," the report added.

It said many of the richest countries in the world are nowhere near achieving the global policy objectives but also deteriorate the implementation process for poorer countries because of negative spillover effects.

India is ranked 116th on the index with a score of 58.1, behind countries such as Nepal, Iran, Sri Lanka, Bhutan and China. Pakistan is ranked 122.

The report said that the countries which are closest to fulfilling the goals are not the biggest economies but comparably small, developed countries.

Sweden leads the list, followed by Denmark and Finland. Among the G7 countries, only Germany and France can be found among the top ten performers. The United States ranks 42nd on the Index, while Russia and China rank 62nd and 71st respectively.

"One of the greatest obstacles to achieving the global goals for high-income countries are poor performances regarding sustainable consumption and production. All countries that score lowest on electronic-waste generation, for example, are high-income countries," it said.

Bertelsmann Stiftung chairman and CEO Aart De Geus said the report's findings show that politicians, businesses and society altogether must urgently intensify their efforts and commit themselves to this agenda.

"SDG Index and Dashboards highlight the need for urgent action on the part of G20 countries in making sustainable development a reality both within and beyond their borders. If the world is to achieve the SDGs, all countries must take up the goals as part of their national development strategies, and ensure that they take responsibility for their impact on the rest of the world," said Jeffrey D Sachs, Director of the SDSN.

The SDG Index and Dashboard collect available data for 157 countries to assess where each country stands in 2017 with regard to achieving the SDGs.

The SDG Index ranks countries based on their performance across the 17 Sustainable Development Goals.

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Tribunal prohibits dumping of waste near Ganga banks - Today's Paper

Solution in sight:A file photo of the garbage dumpedon the banks of the Ganga.AFP

An area of 100 metres from the edge of the Ganga between Haridwar and Unnao has been declared a 'No Development Zone,' with the National Green Tribunal (NGT) on Thursday prohibiting dumping of waste within 500 metres of the river.

An environment compensation of Rs. 50,000 will be imposed on anyone dumping waste in the river.

The NGT also directed the Uttar Pradesh and Uttarakhand governments to formulate guidelines for religious activities on the ghats of the Ganga and its tributaries.

The order said: "Till the demarcation of floodplains and identification of permissible and non-permissible activities by the State government, we direct that 100 metres from the edge of the river would be treated as no development/construction zone between Haridwar to Unnao in Uttar Pradesh."

Order on PIL petition

Giving its verdict on a 1985 PIL petition of environment activist and lawyer M.C. Mehta — which was transferred to the NGT from the Supreme Court in 2014 — a Bench headed by NGT Chairperson Justice Swatanter Kumar said the authorities concerned should complete projects, including a sewage treatment plant and cleaning of drains, within two years. "The Uttar Pradesh government is duty-bound to shift tanneries, within six weeks, from Jajmau in Kanpur to leather parks in Unnao or any other place it considers appropriate."

Supervisory panel

The court also appointed a supervisory committee, headed by the Secretary of the Water Resources Ministry and comprising IIT professors and officials of the Uttar Pradesh government, to oversee implementation of the directions passed in its verdict. The committee is to submit reports at regular intervals.

The Bench further noted that all industrial units in the catchment areas of the Ganga should be stopped from indiscriminate groundwater extraction.

The green court reiterated its earlier order of a ban on mechanical mining in the Ganga and said, "No in-stream mechanical mining is permitted and even the mining on the floodplain should be semi-mechanical and preferably more manual."

"Such mining should be permitted only after a detailed and comprehensive assessment of the annual replenishment of sand and gravel in the riverbed and ensuring that the connectivity of the river is not distur- bed and that only a quantity less or equal to the annual replenishment is permitted to be removed from the riverbed or the banks," it said.

END

Vinod Palyekar

In a clear departure from its stand on the Mahadayi waters dispute, Goa Minister for Water Resources Vinod Palyekar said on Thursday that his State was open to talks with Karnataka and Maharashtra to explore an out-of-tribunal settlement.

He was replying to a question by *The Hindu* on the State government's response to Karnataka Chief Minister Siddaramaiah's letter requesting the Goa Chief Minister for talks and Maharashtra Chief Minister Devendra Fadanvis had also supported it.

'Rigid stance'

Mr. Palyekar said he would discuss the issue with Chief Minister Manohar Parrikar upon his return from the U.S. on Friday.

Asked what made Goa change its "very rigid stance" of sticking to the tribunal verdict only, Mr. Palyekar, who represents Goa Forward Party in the BJP-led coalition government, remarked that all three States had been spending huge sums over the dispute and the legal battle had been on for long. It would be in the fitness of things to explore an amicable solution, he said.

Some proposals

Mr. Palyekar said he recently met Karnataka Minister for Water Resources M.B. Patil at a function in Karnataka. The latter broached the water dispute issue and indicated that they had some proposals such as building power plants jointly with Goa.

"At least it is my personal view that it would be advisable for all the three States as well as for the country if we can sort out our issues through talks. It would save money as well as time and energy," he said.

Verdict next month

On the strong pressure exerted by environmentalists and civil society that with the tribunal expected to give its verdict next month before the expiry of its term, any deviation by the Goa government would compromise its interest, the Minister said his view was that "talks is an option to negotiate and discuss issues, to have a give and take, to reduce the differences and to come to a solution where, as long as Goa's interest is not compromised, there should not be any problem".

"I am of the opinion that it would be a better option to work for an out-of-court settlement by agreeing to discuss the issue. That is what I will tell the Chief Minister," Mr. Palyekar reiterated.

GM mustard policy: SC gives govt. time

The government on Monday informed the Supreme Court that a policy decision on the commercial release of the Genetically Modified (GM) mustard crop is yet to be finalised.

The Centre said it was poring through the various suggestions on and objections to the commercial rollout of the GM crops.

A Bench, led by Chief Justice of India J.S. Khehar and Justice D.Y. Chandrachud, granted the government one week to report back on when the policy would be finalised. It said the policy should be good-intentioned and well-informed.

The court had on October 17, 2016, extended the stay on the commercial release of the GM mustard until further orders. It had asked the Centre to collect public opinion before the release.

The government had assured the court that there would be no commercial release of GM seeds till the views of the public were collected and placed before the appraisal committee.

Sowing without safety

The hearing was conducted on the basis of a petition filed by activist Aruna Rodrigues, who had alleged that the government was sowing GM seeds without the relevant tests.

Mustard is one of India's most important winter crops, sown between mid-October and late November.

Advocate Prashant Bhushan, appearing for Ms. Rodrigues, alleged the government was sowing the seeds in various fields and that the bio-safety dossier, which has to be made public by putting it on the website, had not yet been done.

Says BJP will campaign against corruption, law and order problems and lack of development work in Himachal Pradesh

The process of holding the requisite Board Meetings and Shareholder Meetings has been completed in phases in September 2017.

Ruben George is staying at Ram Nath Kovind's house at Kalyanpur, near Kanpur

Plastic realities

upi.com

Plastics had their origin in cellulose derivatives. The first synthetic plastic was called bakelite and was derived from fossil fuels. During the Second World War, large-scale production of plastic was directed towards the war effort. However, with the declaration of peace, there was a need to do something about the installed capacity. And so, in 1946, Tupperware company came into being.

At present, the use of plastic has become so ubiquitous that even birds, animals and fish have unwittingly made it part of their diet. Disposed plastic degrades slowly, its chemicals getting leached into surroundings. Further, it breaks down into smaller components over time, entering our food chain and landing up on our plates.

According to a 2014 report of the United Nations Environment Programme (UNEP), "the overall natural capital cost of plastic use in the consumer goods sector each year is $75 billion". This will only go up with the rising consumerism and the increasing use of plastic. According to a recent article in *The Guardian,* a million plastic bottles are bought across the world every minute.

However, plastic bottles are not the only problem. There are smaller forms of plastic, no greater in size than 5 mm, called microbeads, first patented in 1972 for use in cleansers. In the 1990s, they began to replace natural material like ground almonds, oatmeal and sea salt in the area of cosmetics. Many cosmetics and toiletry products — ranging from facewashes to toothpastes — use it today. Their abrasive nature lends itself to use in industries such as petroleum, textiles, printing and automobile. An article in the journal *Marine Pollution Bulletin* states that the microbeads are used as exfoliants and that, in a 150-ml bottle, there will be anywhere between 1,37,000 and 28,00,000 microparticles.

The Bureau of Indian Standards (BIS) has recently classified the non-biodegradable microbeads as unsafe for use in consumer products through a draft notification titled, "Classification for cosmetic raw materials and adjuncts, Part 2: List of raw materials generally not recognised as safe for use in cosmetics."

Countries such as the U.S., Canada and the Netherlands have already put in place regulations to stop the use of microbeads in personal-care products. The sooner India adopts such regulations, the better.

The use of plastic in our daily life should be reduced even as their recycling is increased. This has to involve everyone, from the manufacturer to the user to the waste collector and the recycling authority. We as a society need to create an ecosystem that reduces the use of plastic and prevents its escape into the external environment.

Samir Nazareth is the author of '1400 Bananas, 76 Towns & 1 Million People'

The new U.S. Fed Chairman is unlikely to opt for policies that might upset the President's plan

India, Japan civil nuclear deal comes into force

S. Jaishankar | Photo Credit: PTI

The landmark India-Japan civil nuclear agreement came into force on Thursday. Foreign Secretary S. Jaishankar exchanged the diplomatic notes with the Japanese envoy to India to formalise the completion of the process.

"The India-Japan Agreement for Cooperation in the Peaceful Uses of Nuclear Energy entered into force on July 20, 2017 with the exchange of diplomatic notes between Dr. S. Jaishankar, Foreign Secretary and H.E. Mr. Kenji Hiramatsu, Ambassador of Japan to India," said a statement from the Ministry of External Affairs.

The pact was signed in Tokyo during the visit of Prime Minister Narendra Modi to Japan on November 11, 2016.

"This Agreement is a reflection of the strategic partnership between India and Japan and will pave the way for enhanced cooperation in energy security and clean energy. It seeks to promote full cooperation between the two countries in the development and uses of nuclear energy for peaceful purposes on a stable, reliable and predictable basis," said the statement.

The deal is essential for bringing a network of nuclear energy cooperation for India, especially with the U.S. as prominent American nuclear companies are owned by the Japanese nuclear majors like Toshiba.

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END

NGT directs Uttarakhand, Himachal Pradesh to submit guidelines on forest fire

The National Green Tribunal (NGT) today directed the Uttarakhand and Himachal Pradesh governments to submit the national forest fire prevention and control guidelines. A bench headed by NGT Chairperson Justice Swatanter Kumar also asked both the state governments to inform it about the total number of forest fires till date starting from 2016.

"We want both the states to inform us how many forest fires have been reported in 2017 as compared to 2016. You also place on record the national guidelines on forest fires," the bench said. The tribunal, which has already reserved its verdict in the matter, has fixed the case for hearing on July 24.

In Himachal Pradesh during 2016-17, there were 1,545 forest fires which affected 13,069-hectare causing loss of Rs 1.53 crore, whereas, in 2015-16, there were 672 fire incidents which caused harm in 5,749.95 hectare area causing loss of Rs 1.34 crore.

The tribunal had earlier directed the states to submit crisis management plan for prevention and control of forest fires to the Ministry of Environment and Forests (MoEF). It had taken exception to the fact that that the issue of the management plan was pending since 2010 and directed the MoEF to file the details of states which have not submitted the management plan on forest fires.

Voicing concern over forest fires raging in Uttarakhand and Himachal Pradesh, the tribunal had said it was shocked that everybody was taking the issue "so casually" and issued show cause notices to both the states.

Massive forest fires had engulfed a large part of areas in Uttarakhand and Himachal Pradesh in May last year.

Union Home Minister chairs first meeting of Islands Development Agency (IDA)

IDA focuses on Holistic Development of Islands

The Union Home Minister Shri Rajnath Singh chaired the first meeting of the newly constituted Islands Development Agency (IDA), here today. The IDA was set up on June 01, 2017 following the Prime Minister's review meeting for the development of islands.

The Union Home Minister presented the vision for developing India's maritime economy while preserving the natural eco-system and addressing the security concerns. He emphasized upon the need for sustainable development of Islands with people's participation.

The CEO, NITI Aayog made a detailed presentation on the current status and the way forward for holistic development of identified islands. He informed that Concept Development Plans and Detailed Master Plans are being prepared for identified islands with principles of sustainability, people's participation, eco-system preservation and determination of carrying capacity as the guiding principles. Such an exercise is being taken up for the first time in the country.

Admiral D.K. Joshi, former Navy Chief and Vice Chairman of IDA suggested taking up suitable interventions for sustainable implementation of planned projects.

During the meeting, the progress being made for the formulation of integrated master plans and other matters concerning the islands development were reviewed. It was also decided that Lt. Governor of Andaman & Nicobar Islands and Administrator of Lakshadweep Islands will be included as members of IDA.

After detailed consultations with key stakeholders, 10 islands namely Smith, Ross, Aves, Long and Little Andaman in Andaman & Nicobar and Minicoy, Bangaram, Suheli, Cherium and Tinnakara in Lakshadweep have been identified for holistic development in the first phase. With this meeting, the efforts for holistic development of Islands of India received a major boost.

Other Members of the IDA including Cabinet Secretary, Home Secretary, Secretary (Environment, Forests and Climate Change), Secretary (Tourism) and Secretary (Tribal Welfare) also participated in the meeting.

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KSD/NK/PK/KM

Niti Aayog: Niti Aayog clears six proposals for high-tech public transport

NEW DELHI: Mass rapid transportation technologies such as hyperloop, metrino and pod taxis could soon be a reality in India after Niti Aayog cleared half-a-dozen proposals of the transport ministry exploring options to improve public transport.

Following the go-ahead, the transport ministry has formed a six member committee, headed by a former top official of Railways, to study safety parameters associated with these technologies and global practices.

A senior government official at Niti Aayog told ET, the think tank approved the proposals of the transport ministry with a condition that the ministry conducts trial run of all these technologies and puts in place safety measures before starting commercially operation.

For The People

INDIA'S PUBLIC TRANSPORT TO SEE A MASSIVE TECHNOLOGICAL UPGRADATION

NITI Aayog draws up plan

Approves 6 new mass rapid transport systems

Transport ministry will now look at safety parameters

This will be followed by trial runs before commercial launch

STATE of the ART

METRINO: fully automatic, driverless small pods travel independently suspended over an overhead network

POD TAXIS: small automated vehicles – cable cars or pod cars – equipped to carry a small group of passengers

HYPERLOOP: a pod-like vehicle is propelled through a near-vacuum tube connecting cities at speeds matching that of an aircraft

"These new technologies are path breaking and can alter the way of intercity travel in the country. Since we don't have any such thing in India, we need to know the global safety standards and ensure that these technology companies are following it," a senior transport ministry official said. "Even for the pilot project, passenger safety is paramount," the transport ministry official added.

The ministry of road transport and highways sought the approval of Niti Aayog to experiment and introduce six latest mass rapid transportation technologies. These technologies include metrino, stadler buses, hyperloop, pod taxis, hybrid buses and freight rail road.

The new technologies are being explored as current public transportation is unable to resolve the increasing traffic crisis in the country. Besides, some of them are more cost effective than the existing ones.

Once these safety parameters are tried and tested and the pilot run is successful, some of them including metrino, could be up for running by next year's end. "Something like metrino (pod taxis) is almost one tenth of the cost of the metro, so there's a cost advantage as well. However, technologies such as hyperloop can take some time but we would like them to come to India," the official said, adding land has been proposed for the hyperloop project.

Under the hyperloop transportation mechanism, a pod-like vehicle is propelled through a near-vacuum tube connecting cities at speeds matching that of an aircraft while under the freight rail road proposal, elevated corridors would be built with rail lines where freight trucks can be placed and then they would move on rails at high speed, reducing freight time and increasing freight quantity.

ET VIEW: Adopt New Technologies

It does make sense to adopt new technology for urban transportation, especially when the new networks are billed to be so much more energy efficient and innovative. However, it is imperative that we adopt the precautionary principle and conduct extensive field trials. We do need to thoroughly probe the safety and other features of the new technology on offer that is expected to vastly improve speeds and efficiency.

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END

National Centre for Seismology launches 'India Quake' – An App for Earthquake Parameter Dissemination

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Union Minister of Science & Technology, Earth Sciences and Environment, Forests & Climate Change, Dr. Harshvardhan launched an app "India Quake" on the occasion of Foundation Day of Ministry of Earth Sciences in New Delhi today.

National Centre for Seismology (NCS) operates national seismological network with 84 stations. These stations are connected to NCS headquarter through VSAT for real time data communication. In the event of an earthquake NCS locates them using data from its network and disseminate earthquake parameters to all the concerned government department and other stake holders through SMS, email and fax. However this causes some delay in dissemination and also restricts the number of recipients.

To overcome this, a Mobile App has been developed by the NCS for automatic dissemination of earthquake parameter (location, time and magnitude) after the occurrence of earthquakes. The App will make information dissemination faster with no restrictions on the number of recipients. Any citizen can download this App and get the real time earthquake location information on his/her mobile. Other than scientific and administrative benefits of the App, it will help in reducing panic amongst people during an earthquake. For example, if an earthquake occurs in Hindukush region, Afghanistan and is strongly felt in Delhi, then people in Delhi will know in less than 2 minutes that the earthquake has actually occurred in Afghanistan and not in Delhi.

There are two categories of events here, scrutinized and unscrutinized. Unscrutinized events are the earthquake whose parameters have been estimated automatically by the software using the incoming waveform data from remote stations. These solutions are scrutinized and confirmed by the NCS, which form the category of scrutinized events.

RDS/nb

END

India all set to access resources under the Green Climate Fund for Finance Climate Action

'India Committed to the cause of Climate Change': Dr Harsh Vardhan

Union Minister of Environment, Forest and Climate Change, Dr. Harsh Vardhan has said that India is committed to the cause of Climate Change. Delivering the keynote address on the occasion of the signing of Accreditation Master Agreement (AMA) between Green Climate Fund (GCF) and National Bank for Agriculture and Rural Development (NABARD) here today, the Minister said that India has been leading from the front in tackling global climate change issues and it will continue to do so in the future as well. "India, like other developing countries, can do more, if finance and technology development & transfer and capacity building support are ensured as per the convention and its Paris Agreement", Dr. Harsh Vardhan said.

The Minister emphasised that climate justice demands that we remain mindful of the needs and aspirations of the poor. He pointed out that despite being one of the fastest growing economies of the world, India has a significant percentage of population living below the poverty line. "We need to take cognizance of the population size and income inequality and cannot ignore the basic requirement of electricity, housing and food for the poor. We expect GCF to partner with us on these issues and prioritize their work to overcome these challenges," Dr Harsh Vardhan said. He highlighted that India is creating a network of strong institutions that can act as enablers for scaling-up climate action through technologically sound and innovative projects.

Dr. Harsh Vardhan stated that environmental consciousness is the bedrock of our growth aspirations. "We are fully conscious of the need to pursue an ecologically sustainable development pathway. Our Prime Minister Modiji wants to build a new India by 2022 - riding on the demographic dividend and opportunities to use off beat solutions like solar and wind power, smart cities, incentivizing forestry, creating investment openings and overall, involving all in the development process", the Minister said.

Speaking on the occasion, Executive Director of GCF, Amb. Howard Bamsey said that India has been acknowledged as a strong proponent of climate change action and GCF looks forward to greater engagement with India.

Several of the mitigation and adaptation targets, articulated in India's Nationally Determined Contribution (NDC), to meet the international climate obligations are aligned with the Fund's strategic impact areas - viz clean energy, energy efficiency, cities, transport, forestry, agriculture, water health and ecosystems. India's NDC is among the few that make specific reference to the GCF specifically with regard to its role as a source for low-cost finance for its 40% non-fossil fuel based power target. India, with numerous climate change and developmental challenges, needs to engage more purposefully and actively with GCF. The accredited entities need to proactively engage with GCF to take advantage of the available opportunities.

The Green Climate Fund (GCF) is one of the operating entities under financial mechanism set up under the United Nations Framework Convention on Climate Change (UNFCCC) to provide support to developing countries in combating climate change, with resources to be generated from funding by developed country Parties and various other public and private sources. It supports both climate change adaptation and mitigation projects in developing countries.

So far, one project from India on "Installation of Ground Water Recharge System" in Odisha has recently been approved by the GCF for $34 million. Another proposal on coastal areas has already been submitted to the GCF Secretariat and several more projects are in the pipeline.

India has nominated a total of five direct access entities for accreditation by the GCF. Two of these from the public sector and three from the private sector for accreditation by the GCF. The public sector entities are NABARD and Small Industries Development Bank of India (SIDBI). The private sector entities nominated are YES Bank, IDFC Bank and IL&FS Environmental Services. So far, NABARD and SIDBI have been accredited by the GCF.

NABARD is the first entity from India to be accredited as Direct Access Entity (DAE). The signing of AMA between GCF and NABARD is an essential first step for accessing the GCF resources to help safeguard the lives, property and livelihoods of millions of people against climate change impact.

Board Member of GCF from India, Shri Dinesh Sharma, stressed upon submission of large size of proposals or multi state proposals from India to access the GCF resources and said that in coming years, GCF may play an important role in supporting climate change projects.

HK

Dr. Harshvardhan launches "Sagar Vani" - An Integrated Information Dissemination System

Minister of Science & Technology, Earth Sciences and Environment, Forests & Climate Change, Dr. Harshvardhan launched an app "Sagar Vani" on the occasion of Foundation Day of Ministry of Earth Sciences in New Delhi today.

ESSO-Indian National Centre for Ocean Information Services (INCOIS) under Ministry of Earth Sciences (MoES) provides ocean information services for the benefit of various user communities in the country. The services are more fruitfully utilized when the advisories reaches the end user in timely manner and in user readable format. Now-a-days ICT facilities in the country are accessible to large population of the country and that plays a major role in effective dissemination of information to the end user. ESSO-INCOIS has adopted the state-of-the-art technologies and tools available in the country for the timely dissemination of Ocean Information and Advisory Services that includes Potential Fishing Zone (PFZ) advisories, Ocean State Forecast (OSF), High Wave Alerts and Tsunami early warnings.

There are 3288 marine fishing villages and 1511 marine fish landing centres with marine fisher folk population of 3,999,214. About 37.8% (1,511,703) of marine fisher folk are engaged in active fishing. About 927,120 fishermen were involved in actual fishing either full or part time. ESSO-INCOIS is serving about 3.17 lakhs of users directly through in-house efforts as well as through the partnering organizations including NGO's and there is yet to cover. Hence, it is necessary to target the reach of information to the 9.27 lakh involved in actual fishing either full or part time.

Presently, the advisories are being disseminated to the stakeholders from different service sections and through various stakeholders and partners, which might cause delay in dissemination of the services. In order to effectively and timely disseminate the advisories, directly from the lab to the end user, an Integrated Information Dissemination System (IDS) named as "SAGAR VANI" has been developed by ESSO-INCOIS through the Industry M/s. Gaian Solutions Pvt. Ltd.

The 'Sagar Vani' is a software platform where various dissemination modes will be integrated on a single central server. The 'Sagar Vani' includes Multi Lingual SMS, Voice Call / Audio Advisory, Mobile Apps (User / Admin modules), Social Media (Facebook, Twitter, etc.), Email, GTS, Fax, Digital Display Boards, Radio / Television broadcast units, IVRS, Cloud Channels, etc. The system also has facility to provide access to various stakeholders (NGOs, State Fishery Departments, Disaster Management Authorities, etc.) so that they too will be able to further disseminate these ocean information and alerts to the user community.

This 'Sagar Vani' system compares with the most advanced countries' services in terms of speed of delivery, omni channel capabilities and diverseness of services. With this system, the services will be disseminated in local languages using advanced artificial intelligence and machine learning capabilities. For the first time in India, we are also

using the power of television and cable network mediums for topical and alert dissemination services.

The 'Sagar Vani' will now serve the coastal community, especially the fishermen community with the advisories and alerts towards their livelihood as well as their safety at Sea.

RDS/nb

END

Scooping out oil spills made easy by IISER Thiruvananthapuram

Quick removal "It takes only from 30 minutes to two hours from the time of application to scooping out the rigid fibre balls containing congealed oil," says Kana Sureshan (right)

More efficient and quick absorption of crude oil from the sea following marine spill has now become possible thanks to scientists from the Indian Institute of Science, Education and Research (IISER) in Thiruvananthapuram who have developed a hydrophobic sorbent that can suck up oil and congeal it. A hydrophobic material automatically becomes oil-loving and takes up oil when it comes in contact with it. The results were published in the journal *Angewandte Chemie.*

Hydrophobic sorbent

A two-member research team led by Prof. Kana M. Sureshan from the School of Chemistry at IISER developed the hydrophobic sorbent by using a cheap raw material (mannitol) and cellulose pulp as a matrix. Mannitol was converted into a hydrophobic gelator through a one-step process and a solution was made using this compound. Cellulose balls the size of marbles were then dipped in the solution and dried.

"The gelator gets adsorbed on the cellulose fibre through hydrogen bonding. This process of adsorption of gelator on the cellulose fibre matrix changes the cellulose matrix from being very hydrophilic (water-loving) to hydrophobic (water repelling)," says Prof. Sureshan. A hydrophobic material naturally becomes oleilophilic (oil-loving).

Unlike other alternatives, the sorbent can be easily applied over oil-water mixture ,and no solvent is needed for spraying the gelator thus making it environmental benign.The gelator adsorbed on the surface of cellulose fibre is able to absorb oil when it comes in contact with it.

"Once the sorbent sucks the oil, the gelator slowly gets released from the cellulose fibre and congealing of oil takes place," Prof. Sureshan says. Only when the oil congeals can it be removed without the oil dripping due to gravity.

Congealing of oil becomes possible as the gelator used by the team self-assembles to form micro fibres and the oil loses its fluidity and gets trapped within the entangled fibrous network to form a rigid gel. Gelation essentially turns the liquid oil phase into a semi-solid one and this allows the fibre balls with the congealed oil to be simply scooped out or removed using a scoop or a sieve.

"It takes only about 30 minutes to two hours from the time of application to scooping out the rigid fibre balls containing congealed oil, leaving behind clean water. Since crude oil spreads quickly in the sea after a spill, it is necessary to quickly remove the oil from water," Prof. Sureshan says.

The team tested the ability of their sorbent to congeal oil using six different crude oils, including the one from Bombay High.

Irrespective of the different viscosities of the six crude oils tested, the sorbent was able to absorb the oil and the rigid globules could be scooped out in 30 minutes to two hours.

Studies found that the sorbent was able to absorb and congeal 16 times its own weight of oil. The absorbed oil can be recovered by applying pressure or fractionated by a simple distillation process.

A study of nearly 300 people living in different parts of India found that nine single-base variants

(single-nucleotide polymorphisms or SNPs) account