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BLACK CARBON LINKED TO PREMATURE MORTALITY

Relevant for: Environment | Topic: Environmental Degradation - GHGs, Ozone Depletion and Climate Change

The Indo-Gangetic plain has a high burden of black carbon with serious implications for regional climate and human health. | Photo Credit: [AFP](#)

Black carbon (BC), a form of particulate matter that results from carbon emissions, was most associated with premature mortality, according to a study that tracked mortality rates from different classes of air pollutants in Varanasi, Uttar Pradesh.

The study was funded by the Department of Science and Technology (DST) and conducted by researchers at the Indian Institute of Technology, Banaras Hindu University (BHU); St. Johns Medical College, Bengaluru, and the DST-Mahamana Centre of Excellence in Climate Change Research, BHU.

It appears in the peer-reviewed journal *Atmospheric Environment*.

The Indo-Gangetic plain has a high burden of black carbon with serious implications for regional climate and human health. Several cities in this belt routinely find themselves at the top of the list of the most polluted cities in India as well as the world. Black carbon results from incomplete burning of fossil fuel and studies have previously linked it to global warming. It's a relatively short-lived pollutant in the atmosphere but influences cloud formation and atmospheric heat absorption processes.

“However, most of the pollutions-based epidemiological studies essentially relate exposure to particulate mass concentration (PM 10 and/or PM 2.5) that invariably generalise all particulates with equal toxicity without distinguishing individuals by its source and composition, which genuinely have different health consequences. Importantly, the health effects in terms of mortality due to BC aerosol exposure have never been evaluated in India,” the authors note in a statement issued by the DST.

A 10-point increase in air pollution from black carbon led to an average 5% increase in mortality whereas a similar rise in PM 2.5 led to an average 1% increase in mortality. Nitrogen dioxide (NO₂) and Sulphur Dioxide (SO₂) were both associated with a 2.3% and 1.3% increase in mortality, according to calculations by the team.

The detrimental effect of pollutants was higher for males, age group 5-44 years and, in winter. They found that the adverse effect of air pollutants was not limited to current day of exposure but could extend to as late as five days after exposure. Including BC as a potential health hazard inspires and provided a background for more epidemiological studies to provide evidence of health effects of air pollutants from different parts of India, the authors note.

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Depression could be exacerbated post-long COVID, says expert.

If the recommendations of a 13-member expert committee headed by cardiologist Devi Prasad Shetty are implemented by the State government, detection of

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WATCH

Relevant for: Environment | Topic: Environmental Degradation - GHGs, Ozone Depletion and Climate Change

Over the past few months, Turkey's Marmara sea has been facing a new challenge.

The Marmara sea that connects the Black Sea to the Aegean Sea has been blanketed with '[sea snot](#)' [causing new environmental concerns](#). Sea-snot is a thick, foamy layer of marine mucilage formed from the algae present in the water.

It was first reported in Turkey in 2007. However, the current outbreak is the largest on record. The mucilage is now covering the surface of the sea and has spread to 80-100 feet below the surface, posing a threat to the marine ecosystem.

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WESTERN GHATS RECORD A NEW-TO-SCIENCE SEMI SLUG

Relevant for: Environment | Topic: Biodiversity, Ecology, and Wildlife Related Issues

The Western Ghats have yielded a genus and species of nocturnal semi slug new to science.

The Western Ghats have yielded a genus and species of nocturnal semi slug new to science.

The newly described glossy grey or greyish-white *Varadia amboliensis* with irregular dark mottling measures 6.9 cm long at most, but scientists are enthused by its sensitivity to the slightest of climatic fluctuation.

The genus of the new land species has been named after Varad Giri in recognition of his transformative contribution to the study and conservation of the Indian herpetofauna while the species name 'amboliensis' refers to the Amboli area of Maharashtra's Sindhudurg district.

The study describing it at the end of a five-year research has been published in the *European Journal of Taxonomy*.

Zoologist Amrut R. Bhosale of the Kolhapur-based Shivaji University is the primary author of the study conducted with Dinarzarde Raheem, a scientific associate of London's Natural History Museum.

The collaborators of the study include Christopher Wade of the University of Nottingham, Ahmed Saadi of the University of Vienna, Tejas Thackeray of the Mumbai-based Thackeray Wildlife Foundation, Aasif Tamboli of South Korea's Kyungpook National University and Suhas Kadam and D.V. Muley of Shivaji University.

"Semi-slugs are so-called because their shells are relatively small in comparison to the body, with the shell often partly or almost entirely covered by extensions of the snail's 'skin', the mantle. In the new semi-slug, the parts of the mantle covering the shell lobes are retractable, so that the shell can be completely covered by the mantle or largely exposed," Dr Bhosale said.

The semi-slug is endemic to the northern and central Western Ghats and primarily found in natural forests. It is most active at night and is known from only a handful of localities in Maharashtra, Goa and Karnataka.

The shell of the adult semi-slug is depressed and ranges from glossy golden brown to reddish yellow with rapidly increasing whorls.

Before *Varadia amboliensis*, South Asia had 21 genera and more than 400 described species in the superfamily it belongs to.

"As land snails are ecological indicators, they are susceptible to slight climatic fluctuations. They feed on leaf litter present on the forest floor and dead insects. They are the natural source of calcium to the wild animals as they recycle nutrients such as potassium, manganese and magnesium," Dr. Bhosale told *The Hindu*.

"We still don't know that how many undescribed species of land snails are facing threat. The new semi-slug will help us apply conservation strategies in future."

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BLACK CARBON COULD LEAD TO PREMATURE MORTALITY: STUDY

Relevant for: Environment | Topic: Environmental Degradation - GHGs, Ozone Depletion and Climate Change

Black Carbon has a significant adverse effect on human health and leads to premature mortality, says a new study. The study could help in the estimation of future burden of mortality associated with air pollutants more accurately.

The Indo-Gangetic plain is exposed to black carbon (BC) with serious implications on regional climate and human health. However, most of the pollutions-based epidemiological studies essentially relate exposure to particulate mass concentration (PM 10 and/or PM 2.5) that invariably generalize all particulates with equal toxicity without distinguishing individuals by its source and composition, which genuinely have different health consequences. Importantly, the health effects in terms of mortality due to BC aerosol exposure have never been evaluated in India.

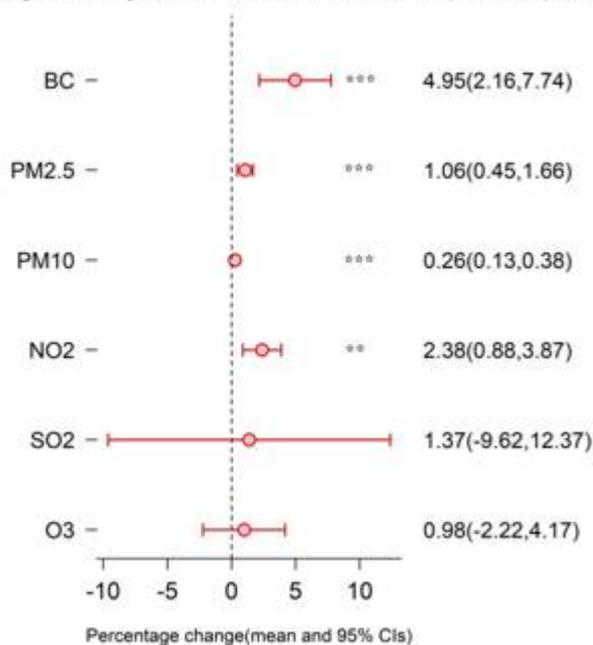
R.K. Mall led the team of scientists including Nidhi Singh, Alaa Mhawish, Tirthankar Banerjee, Santu Ghosh, R. S. Singh from the Department of Science & Technology-Mahamana Centre of Excellence in Climate Change Research (MCECCR) at Banaras Hindu University explored the individual as well as the cumulative impact of BC aerosol, fine (PM 2.5), and coarse (PM 10) particulates, and trace gases (SO₂, NO₂, O₃) on premature mortality in Varanasi. They have recently published their research in a reputed journal "*Atmospheric Environment*".

A typical urban pollution hotspot in central Indo-Gangetic Plain (IGP), the town experiences very high aerosol loading and trace gas concentrations throughout the year due to prevalence of a subsidence zone and observed decadal increasing trends both in Aerosol Optical Depth and Black Carbon aerosols.

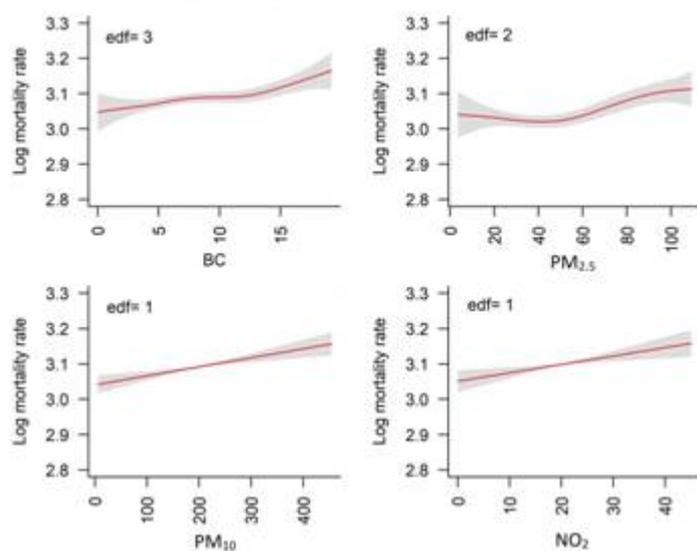
The Scientists from the Centre of Excellence in Climate Change Research supported by the Climate Change programme of Department of Science and Technology (DST) utilized daily all-cause mortality and ambient air quality from 2009 to 2016 to clearly establish a significant impact of BC aerosols, NO₂ and, PM2.5 exposure on mortality. The inclusion of co-pollutants (NO₂ and PM 2.5) in the multi-pollutant model increased the individual mortality risks for BC aerosols. The effect of pollutants was more prominent for males, age group 5-44 and, in winter. They found that the adverse effect of air pollutants was not limited to current day of exposure but can extend as high as up to 5 days (Lag effect). They further showed that mortality rises linearly with an increase in air pollutants level and shows adverse impact at higher levels.

Inclusion of BC as a potential health hazard inspires and provides a background for more epidemiological studies to provide evidence of health effects of air pollutants from different parts of India. The study could also help estimate the future burden of mortality associated with air pollutants considering the present association and incorporating a growing population rate. This will help government and policy-makers for better planning to mitigate the adversity associated with changing climate-air pollution-health nexus.

Percent change in mortality associated with 10-unit increase in air pollution exposure



Exposure-response curves of individual air pollutants



Publication link:

<https://doi.org/10.1016/j.atmosenv.2020.118088>

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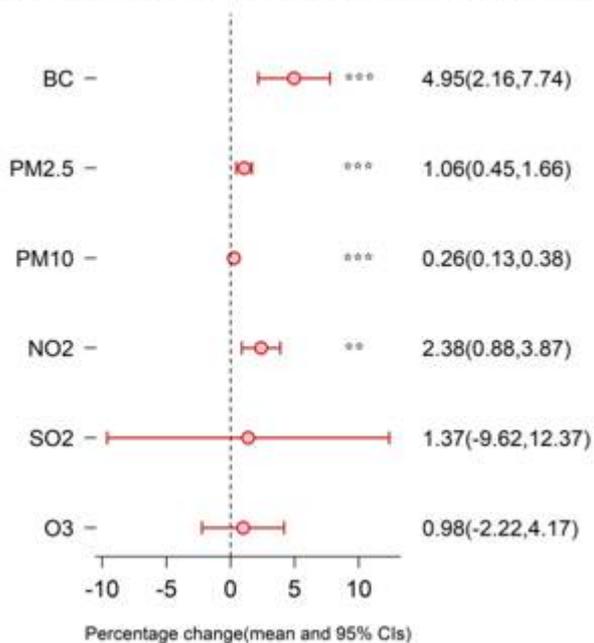
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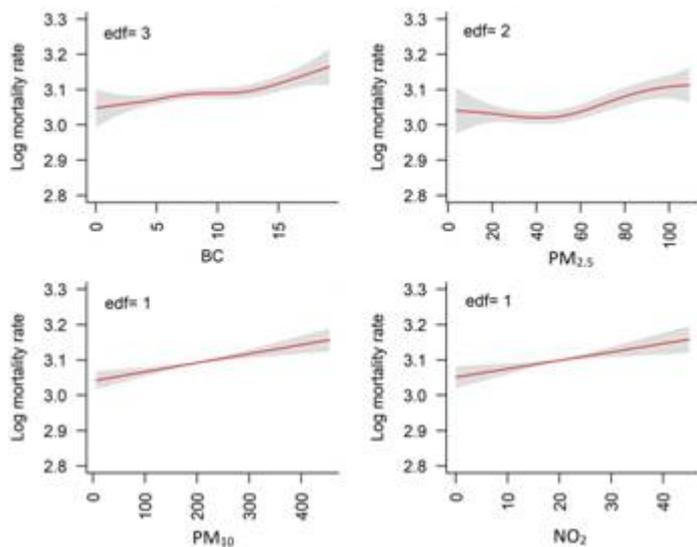
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STUDY ON SOCIAL BEHAVIOUR OF MALE ASIAN ELEPHANTS

Relevant for: Environment | Topic: Biodiversity, Ecology, and Wildlife Related Issues

As human-elephant conflicts increase with time and expanding human range, understanding social behaviour becomes crucial to the conservation and management of the highly social and endangered Asian elephant.

The Asian elephant is a charismatic species with a long history of co-existence with humans. Yet works on male societies of wild elephants based on long-term observations are rare. To fill this gap, researchers from Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), an autonomous Institute of the Department of Science and Technology, Government of India, studied associations of male Asian elephants by collecting and analysing data on behaviour of identified non-musth wild Asian elephants of Nagarhole and Bandipur National Parks.

They found that the time spent by male Asian elephants in all-male and mixed-sex groups depended on the age of the male. Adult Asian male elephants preferred to spend their time alone than in mixed-sex or in all-male groups. Besides, old males were found mostly in the company of their age peers and less frequently with young males (15 to 30 years of age). Also, young males did not disproportionately initiate associations with old males.

Adult male Asian elephants are less social than females. They enter musth -- a mate-searching strategy for old (above 30 years of age) males, annually. The researchers hypothesised that when the adult males enter musth, dominance relationships may affect the number of mating opportunities they procure. Hence, it might be more crucial for old males than for young males to test strength with each other and settle dominance relationships during their non-musth time.

On the other hand, since young males associated less with females during musth than non-musth time, they might also be using their non-musth time to search for mating opportunities.

The team observed male elephants and identified them using features of their ears, tails, and tusks and recorded whether males associated with each other in the presence or absence of females. They used six years of field data on 83 identified males for this study, which was published in the open-access journal 'Frontiers in Ecology and Evolution'. They considered two possible reasons for male associations -- non-musth males may use their time to fight with males of the same age class, who would be of similar sizes, to decide their dominance relationships, and young males might also use their associations to learn from older males about food resources and/or reproductive behaviour.

Their results showed that all-male groups (in the absence of females) were rare and small. According to the team, social learning from older males did not seem to play a big role in male associations. In contrast, African savannah elephants have been found to spend more time in all-male groups and to form larger groups, and young males preferred to associate with older males.

The researchers said that this could be due to the difference in the dispersion of food resources in the habitats occupied by the two species.

This study is one of the few that examines male associations in species in which males rove between social groups. It provides an example of how ecological differences could possibly drive

differences in male societies in related species with similar male reproductive strategies.



Fig. 1: All-male group with two adult males associating in female absence. One of the males here is tuskless (location of the photograph study area).



Mixed-sex group with two adult males associating in female presence (location of the photograph study area).

Photos: Kabini Elephant Project for the credits.

Publication details:

[https://www.frontiersin.org/articles/10.3389/fevo.2021.616666/full?&utm_source=Email_to_authors&utm_medium=Email&utm_content=T1_11.5e1_author&utm_campaign=Email_publication&field=&journalName=Frontiers in Ecology and Evolution&id=616666](https://www.frontiersin.org/articles/10.3389/fevo.2021.616666/full?&utm_source=Email_to_authors&utm_medium=Email&utm_content=T1_11.5e1_author&utm_campaign=Email_publication&field=&journalName=Frontiers%20in%20Ecology%20and%20Evolution&id=616666)

For more details, Prof.T.N.C. Vidya (tncvidya@jncasr.ac.in) may be contacted.

SS/RKP/ (DST Media Cell)

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NEW PLANT RECORDED IN INDIA IS INVASIVE WEED ELSEWHERE

Relevant for: Environment | Topic: Biodiversity, Ecology, and Wildlife Related Issues

Strobilanthes reptans appears has earned the Indian tag with the reputation of being an invasive weed in the Indo-Pacific islands. | Photo Credit: [Special Arrangement](#)

This is one find the botanists involved wish they had never had to record.

Strobilanthes reptans appears ornamental. But it has earned the Indian tag with the reputation of being an invasive weed in the Indo-Pacific islands.

Jatindra Sarma had come across this plant during a 2019 trip to Tipi in Arunachal Pradesh's West Kameng district. He brought a sample into cultivation for studying its floral morphology when he was posted as the Conservator of Forests based in northern Assam's Tezpur.

The taxonomical study of the plant with H.A. Barbhuiya and C.K. Salunkhe of Mumbai's Bhabha Atomic Research Centre and S. Dey Nagaland University's Department of Botany confirmed it as *Strobilanthes reptans*.

Their paper establishing the species as a new addition to the flora of India was published in *Rheedia*, the journal of the Indian Association for Angiosperm Taxonomy.

Mr. Sarma, now the Chief Conservator of Forests in southern Assam, said the plant has not had any adverse effect on indigenous flora as it is restricted to a single locality measuring less than 1 sq. km. "Therefore, in the current scenario, no action needs to be taken to control its spread," he said.

The *Strobilanthes reptans* was found growing up to 20 cm tall on grassy hill slopes at 150 metres above mean sea level. It sported tubular white or pale violet flowers with darker veins from June to September, and yielded fruit from July to December.

"We could not trace its cultivation in India as the plant is a little-known ornamental. How the plant reached Tipi needs to be studied and because it was encountered in a semi-disturbed area, there is evidence for its escape (to other parts) and naturalisation," Mr. Sarma said.

The researchers said the plant could possibly have escaped from cultivation from Myanmar, Thailand, Laos, Vietnam, Malaysia or Sri Lanka, where it has naturalised. The plant has also been recorded in Taiwan, Ryukyu islands of Japan, northern Australia, Singapore, Hawaii and a few other countries.

The study recommended further investigation and monitoring of the population of the *Strobilanthes reptans*.

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OVER 7 LAKH YEARLY DEATHS IN INDIA LINKED TO ABNORMAL TEMPERATURES: LANCET STUDY

Relevant for: Environment | Topic: Environmental Degradation - GHGs, Ozone Depletion and Climate Change

Study reveals more than 7 lakh yearly deaths due to heat and cold | Photo Credit: [Rajesh N](#)

Nearly 740,000 excess deaths in India annually can be attributed to abnormal hot and cold temperatures related to climate change, according to a study published in The Lancet Planetary Health journal.

An international team, led by researchers at Monash University in Australia, found that globally more than five million extra deaths a year can be attributed to non-optimal temperatures.

The study published on Wednesday found that deaths related to hot temperatures increased in all regions from 2000 to 2019, indicating that global warming due to climate change will make this mortality figure worse in the future.

In India, the number of deaths per year linked with abnormal cold temperatures is 655,400, while as the number of deaths associated with high temperatures is 83,700, according to the researchers.

The team looked at mortality and temperature data across the world from 2000 to 2019, a period when global temperatures rose by 0.26 degrees Celsius per decade.

The study, the first to definitively link non-optimal temperatures to annual increases in mortality, found 9.43 per cent of global deaths could be attributed to cold and hot temperatures.

This equates to 74 excess deaths for every 100,000 people, with most deaths caused by cold exposure.

Global warming may “slightly reduce the number of temperature-related deaths, largely because of the lessening in cold-related mortality,” said Professor Yuming Guo, from the Monash University.

“However in the long-term climate change is expected to increase the mortality burden because heat-related mortality would be continuing to increase,” Guo said.

The data shows geographic differences in the impact of non-optimal temperatures on mortality, with Eastern Europe and Sub-Saharan Africa having the highest heat and cold-related excess death rates.

Cold-related death decreased 0.51 per cent from 2000 to 2019, while heat-related death increased 0.21 per cent, leading to a reduction in net mortality due to cold and hot temperatures.

Of the global deaths attributed to abnormal cold and heat, the study found more than half occurred in Asia, particularly in East and South Asia.

Europe had the highest excess death rates per 100,000 due to heat exposure, according to the researchers.

Sub-Saharan Africa had the highest death rates per 100,000 due to exposure to cold, they said.

The largest decline of net mortality occurred in Southeast Asia while there was temporal increase in South Asia and Europe.

Previous studies had looked at temperature-related mortality within a single country or region.

“This is the first study to get a global overview of mortality due to non-optimal temperature conditions between 2000 and 2019, the hottest period since the Pre-Industrial era,” Guo said.

The researchers used data from 43 countries across five continents with different climates, socioeconomic and demographic conditions and differing levels of infrastructure and public health services.

“The study had a large and varied sample size, unlike previous studies,” Guo added.

The mortality data from this study is significantly higher than the second-largest study published in 2015, conducted across 13 countries/regions, which estimated 7.7 per cent of deaths were related to cold and hot temperatures.

“The importance of taking data from all points of the globe was to get a more accurate understanding of the real impact of non-optimal temperatures under climate change,” Guo said.

Understanding the geographic patterns of temperature-related mortality is important for the international collaboration in developing policies and strategies in climate change mitigation and adaptation and health protection, he added.

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Depending on how well humans get a handle on carbon emissions and rising temperatures, a child born today could be confronted with multiple climate-related health threats before turning 30, the report shows.

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GREEN ENERGY PROJECTS THREATEN THE LAST REFUGES OF THE ENDANGERED GREAT INDIAN BUSTARD

Relevant for: Environment | Topic: Biodiversity, Ecology, and Wildlife Related Issues

A bustard flies high near wind turbines and power lines in the Pokhran desert area in Rajasthan. | Photo Credit: [Devesh Gadhvi](#)

As you approach Pokhran, the skyline is taken over by giants. They are wind turbines and lofty steel towers that stand tall against the yellow sand dunes, making the landscape look like a dystopian Lego town. The tops of the towers are painted a menacing red; they stand tall as if holding hands with the power lines.

Close to Pokhran, where India once flexed its nuclear muscle, a new power struggle is emerging in the sand dunes of Rajasthan. This one is between the people who live there and the power companies that promise clean and green energy to the nation. Caught in this crossfire is a critically endangered bird that has been on a collision course with the power companies' high tension wires. The Wildlife Institute of India (WII) estimates that about 15% of the great Indian bustard (GIB) population dies each year due to collision with power lines, making this the most significant threat to the majestic bird today.

The bustard has had a chequered history; its unusual name stopped it from being declared the 'national bird' of India. Once found in large numbers across the country, Rajasthan is now home to the single largest viable population of the species. But the State has other plans for the bustard's habitat — an array of solar and wind energy projects. A WII report from 2020 minced no words: 'unless power line mortality is mitigated urgently, extinction of GIBs is certain', it said. And that led to a Supreme Court order in April 2021 mandating that all power lines in both the 'potential' and the 'priority' habitats of the bird be laid underground. This was a path-breaking order, as it included not just the small area of the Desert National Park in Jaisalmer, but also encompassed a much larger tract of the last remaining suitable habitat, as this would ensure the long-term conservation of the species and the successful reintroduction of captive-bred birds in the future.

Near Pokhran, I meet Sumer Singh Bhati, who owns more than 300 camels. With his straw hat and camera strapped around his neck, he could pass of as an enthusiastic tour guide. What he is enthusiastic about is birds. These days, however, his phone card is full of images of dead birds that have crashed against the power lines. Bhati says he has become a champion for the GIB in the last five years; the plight of the dead birds moved him. He's also upset that the *Degray Oran* or the sacred grove — said to be over 600 years old — used by his community for grazing their livestock is now being used by the power companies to install power lines. What angered the people of his village most was the destruction of the trees they had preserved for generations. The National Green Tribunal prohibited the laying of power lines in the sacred grove, but this did not stop the violations.

Colossal towers

We are standing in the blazing heat with the colossal towers above our heads, in the heart of the *Oran*, when a car pulls up from one of the power companies. The men want to know why we are here. Since the order from the Supreme Court, everyone is nervous. They assess us from a distance, make enquiries from our driver, and leave. We walk further, and I am curious about the

colourful discs, or 'bird diverters', which give a rather aesthetic look to the deathly wires. Diverters are essentially bright plastic discs that appear like Christmas lights and are meant to alert birds in flight from a distance to avoid collision. But there is debate in the scientific community about their efficacy for bustards.

The sun is now so bright it is impossible to look ahead with the naked eye. We continue walking; up ahead, a group of four men are hard at work; they say they are migrants from Bihar employed as daily wage workers by the renewable power companies. They have been hired to install diverters every six feet. Like cowboys, they suspend themselves from the hanging wires, pull themselves up 20-30 feet above the ground to tie the diverters; there is no umbrella, no shade, no tree to protect them from the blistering heat. Not even a safety net in case they fall. The work continues at a frenetic pace, perhaps since the Supreme Court has directed that till the lines are taken underground, these diverters must be installed. The workers have a long day ahead.

Conflicting reports

A short breeze makes the deflectors sway like wind chimes, but Bhati says the birds are still colliding with the wires. His observation is backed by scientists. Devesh Gadhvi, an ecologist, conservationist, and member of the Supreme Court-appointed committee that will decide the feasibility of transmission lines to be taken underground, says: "Meta analysis shows diverters reduce mortality by 50% for birds in general, but the reduction is lower for bustards, according to recent evidence."

Subrahmanyam Pulipaka, CEO of the National Solar Energy Federation of India, disagrees. He wants to present research to the Supreme Court committee that diverters will work. "We have reviewed experiences from some 40 countries, and in some of these, birds from the bustard family were affected too, for instance in Spain, Namibia and Hungary. These countries have installed bird diverters, line markers, and UV paint on the transmission lines to mitigate collision, and the results were very promising. In some cases, there was a reduction in the mortality rate by as much as 95%," he says.

Sumit Dookia, an ecologist, who has been working in the desert State, believes the local people are central to conserving the species. Dookia recalls his first sighting of the GIB with Asad Rahmani, one of the most vocal advocates for saving this precious bird. "In 2002, I got an opportunity to join Dr. Rahmani and I saw my first GIB, a pair, in Bikaner district." For Dookia, that moment was life-changing, and he started mobilising people to support GIB conservation. His efforts paid off — there are now many GIB mascots in Rajasthan who have come forward to help or report violations of the court orders. But violations continue, and the potential GIB habitat is huge, so monitoring and compliance with various court orders has become a cat-and-mouse game between the villagers and the companies.

Tracing accountability

As we walk around, we notice an earthmover that has been deployed to dig up the ground for new power lines. When we ask the men at work, they say they are daily wage workers but confirm they are digging the land for new power lines. Since no one is a full-time employee, tracing back accountability to any company is challenging.

By late afternoon, we make our way towards a grassland patch where we are told there may be some chance of catching a glimpse of the GIB. Our tired eyes get some visual relief from the hundreds of spiny-tailed lizards that pop up from the ground for a few seconds or scurry across the grass.

Just as the last of the sun's rays hit the grassland, we get lucky. Up ahead in the distance is a male bird. It's only when you see the bustard in the wild that you realise what the fuss is all about. There is something royal about the bird as it surveys its territory with its head held high. If this was a Disney musical, I can imagine the bird bursting into song, holding its white breeches. To be in the presence of this grand old bird of the agro-pastoral landscape makes you deeply conscious of its value, not just as a mascot of the grasslands but as a crucial piece in the eco-jigsaw. Our role is to ensure it is not wiped off the face of the planet. Perhaps the GIB needs a smart marketing strategy, something that endears it to tourists, like the tiger's.

Ecological footprint

Meanwhile, emboldened by the State government, the power companies are working on ways to avoid implementing the court order. Pulipaka admits there are problems. "Cost is just one of the factors. It is a globally established fact that undergrounding is significantly expensive, especially for high voltage lines."

The threat in this habitat is not the only such green energy vs. wildlife conflict in the country. Koyna Wildlife Sanctuary in Maharashtra, for instance, has one of the largest wind farms, which has impacted biodiversity, specifically the behavioural activities of the fan-throated lizard. Wind farms in the Gulf of Khambhat in Gujarat threaten to impact marine biodiversity. Andhra Lake Wind Farm, close to Bhimashankar Wildlife Sanctuary in Maharashtra, has led to the felling of trees and diversion of forest land. This, in turn, has deprived local people of access to common resources.

Thus far, it's fossil fuel companies that have had the worst environmental records — not just in terms of pollution but also land grabs and violation of human rights. Renewable energy companies have promoted themselves as the 'noble' alternative, providing clean energy, free from carbon emissions. As India turns to such projects on a large scale, one must remember that while they may be clean, they still have an ecological footprint. And if they want to retain their 'clean' image, they have to control their environmental impact.

The predicament of the bustard gives them a chance to rise to the occasion. Let them take their transmission lines underground so that the great bird soars safely again.

The writer is an award-winning journalist and author of Rewilding in India.

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SIKKIM BLOSSOMS: STATE HOME TO 27% OF INDIA'S FLOWERING PLANTS

Relevant for: Environment | Topic: Biodiversity, Ecology, and Wildlife Related Issues

Flower power: Rhododendron aeruginosum and Hypericum reptans in Sikkim. Special Arrangement

Sikkim, the smallest State with less than 1% of India's landmass, is home to 27% of all flowering plants found in the country, reveals a recent publication by the Botanical Survey of India (BSI). *Flora of Sikkim – A Pictorial Guide*, released earlier this week, lists 4,912 naturally occurring flowering plants in the tiny Himalayan State.

"The total number of naturally occurring flowering plants in the country is about 18,004 species, and with 4,912 species, the diversity of flowering plants in Sikkim, spread over an area of 7,096 sq. km is very unique," Rajib Gogoi, Scientist and Regional Head, BSI, Gangtok, and the lead author of the publication, said.

Dr. Gogoi said the publication provides details of 5,068 taxa (including 152 cultivated taxa) belonging to 1,491 genera and 209 angiosperm families which are naturally occurring flowering plants, along with geography, ecology, vegetation pattern and forest types of Sikkim.

The other authors of the publication include Norbu Sherpa, J.H. Franklin Benjamin, D.K. Agrawala, S.K. Rai and S.S. Dash. In the 582-page publication, the authors have included more than 2,000 photographs of about 1,350 plant species from the State.

Kanchenjuga biosphere

The State, which is a part of the Kanchenjuga biosphere landscape, has different altitudinal ecosystems, which provide opportunity for herbs and trees to grow and thrive.

"From subalpine vegetation to the temperate to the tropical, the State has different kinds of vegetation, and that is the reason for such a diversity of flora. The elevation also varies between 300 metres and 8,598 metres above mean sea level, the apex being the top of Mt. Kanchenjuga (8,586 metres)," Ashiho A. Mao, Director of BSI, said. Dr. Mao emphasised the need to have updated checklist of flora of every State, and active cooperation with the State government is needed in this regard.

Sikkim's Minister of Forest and Environment Karma Loday Bhutia, who was present at the launch of the publication, said that along with unique geographical features, the people of Sikkim have a unique bond with nature and trees. The Minister referred to the notification titled Sikkim Forest Tree (Amity & Reverence) Rules, 2017 which state that the, "State government shall allow any person to associate with trees standing on his or her private land or on any public land by entering into a Mith/Mit or Mitini relationship." The notification encouraged people to adopt a tree "as if it was his or her own child in which case the tree shall be called an adopted tree".

Mr. Bhutia, however, expressed concern that certain activities in the mountain State were being carried out without considering their impact on the environment and biodiversity. "The widening of roads to Nathu La, which is of strategic interest to us (bordering China), and the hydel power plants in north Sikkim, should also take into account the environmental concerns of locals. We are not against such activities, but it should not come at the cost of our biodiversity," the Minister

said.

Orchids galore

The publication details 532 species of wild orchids (which is more than 40% of all orchid species found in India), 36 species of rhododendron and 20 species of oak, and more than 30 species of high value medicinal plants, among other species.

Mr. Gogoi said that the founding fathers of botany were always interested in the flora of Sikkim. Sir Joseph Dalton Hooker, one of the pioneers of modern botany, conducted the first survey of Sikkim in 1848 and published *Rhododendrons of Sikkim* . In 1898, two British botanists, Sir George King and Robert Pantling, published their monumental work, *The Orchids of Sikkim-Himalayas* .

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THE INDIAN COURSER IS ON UNCERTAIN GROUND

Relevant for: Environment | Topic: Biodiversity, Ecology, and Wildlife Related Issues

The Indian courser, a bird of dry open land, at Mamandur in Kancheepuram. Photo: Rama Neelamegam

When parents pop out of sight, an infant has trouble believing they have not disappeared forever. As it grows in days, the infant totters on to an understanding of “object permanence”, learning not to equate “popping out of sight” with “going out of existence”.

The problem arises when infants that have grown into adults fail to unlearn the lesson of object permanence in certain situations. If something — and someone — keeps popping out of sight far too often, and pops back in only after a drearily long passage of time, it may actually be disappearing from the scene. Not with a bang, but with a series of inscrutable budes.

Applying this logic to wildlife conservation, wildlife ecologists can sometimes get overly optimistic about a species’ resilience, believing it exists in the same encouraging numbers, ignoring growing evidence that it is checking out of many of its known habitats. Talking of a specific case, there is evidence that it is time to such shed misplaced optimism about the Indian courser (*cursorius coromandelicus*).

The Indian courser is found across India in patches of suitable habitats. Though still described “widespread” and of “least concern”, the bird puts in rare appearances in many of its known habitats. In Chennai and surrounding districts, Indian courser’s occurrence data is patchy, being occasionally reported from lake beds (when they had become dry), the most notable example being Siruthavoor.

With the Indian courser, ornithologist V Santharam employs unminced language one wants to hear more often.

“The Indian Courser is one of those species likely to become hugely uncommon and disappear in the next few decades. It has already become uncommon in many areas. Because, open areas are places people think should not be left open.” The Indian courser is viewed as a ground bird, because it largely sticks to *terra firma* even when it perceives a threat to its safety. Its “fleeing” behaviour shows this bird bets on its wings as well as its legs to carry it to safety — more on the latter. The Indian courser belongs to the category of birds that make short work of nest-building. The nest is just a scrape in the ground.

Its preference for open, dry land is what puts the bird at a huge disadvantage. Because, it is just the kind of earth that turns the eyes of “development”, eyes that view fallow lands as waiting to be “put to good use”.

“These birds like open lands, open dry river beds, lake beds and open stony dry country,” points out Santharam. “The Indian Courser is receding because it prefers open areas which are sparsely populated and less disturbed.”

On the subject of how the Indian courser is being squeezed out of its habitats, the ornithologist presents a snapshot of a pre-monsoonal Pallikaranai from the 1980s.

“We have seen the species in Pallikaranai Marsh. Those days, you would be able to spot it right from the road (which would later go on to become the Pallavaram-Thoriapakkam 200-foot Radial

Road.”

The natural water-flow movement of the Marsh existing at that time provided a conducive environment for the Indian courser during certain months of the year. “In those days (just as now), the Pallikaranai area would be inundated up to the road during the monsoon. But the difference is that once the rains stopped, the water would start receding. There would be these areas along the road, for at least up to 300 metres on both sides, that would be covered with slight grass in most parts and be slushy in some parts. Overall, it would offer a more dry kind of habitat for months. When the water was down — as I have seen in the months of September and October before the monsoon arrived — the Oriental pratincoles would come. So would the Indian coursers,” explains Santharam.

He then goes on to present the prevailing situation. “But now, there is water logging through the year, changing the quality of the habitat. Reeds are found right next to the road. In those days, reeds would be seen only half a kilometre away. When the section got developed, the character of the place changed. The water would not flow that freely and started stagnating and reeds also started coming up close to the road.”

“The Indian courser is one the most neglected and least studied birds,” says S Balachandran, deputy director at the BHNS Regional Migration Study Centre in Point Calimere. “It is not a common bird, and over 40 years of field studies, primarily across Tamil Nadu, I must have had only 10 sightings of the Indian Courser. In the Tirunelveli side, in a dry area, I had seen one or two Indian coursers. Other of the rare sightings I have had of this species include the ones at Kaliveli and Kodiakarai. Going by the Tamil Nadu experience, the bird is scarcely found. As the bird prefers neither wetlands nor forests, and is a species of dry open land, surveying it can a challenge. Being found in barren and dry grassland, this bird suffers directly from development activities. It is affected just as the yellow-wattled lapwing is, which is also a bird of dry open land.” While according due importance to the role of citizen-science efforts to document sightings of species like the Indian Courser, Balachandran punctuates the necessity of carrying out a sustained study of the Indian courser.

(‘Uncommon Resident’ discusses resident birds of Chennai and surrounding districts that are not easily seen, and may be dwindling in numbers)

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CHINA DENIES POLITICS BEHIND UNESCO MOVE ON BARRIER REEF

Relevant for: Environment | Topic: Environmental Degradation - GHGs, Ozone Depletion and Climate Change

A top Chinese official said on Sunday that political tensions between Beijing and Australia were not behind a UNESCO recommendation to place the Great Barrier Reef on its endangered list.

Deputy Education Minister Tian Xuejun is chairing the meeting of the UN cultural agency's heritage committee, which comes amid worsening relations between China and Australia.

The Great Barrier Reef has been put on a list of World Heritage sites that could be put on the in-danger list after losing half of its corals since 1995.

Australia has assailed the move, blaming global warming for the loss, while UNESCO experts argued that pollution run-off has contributed to the loss.

When asked about "Australian government allegations" that Beijing pressed to have the Barrier Reef listed as endangered, Mr. Tian said the decision was based "on reports and data provided by Australia itself." "Australia should fulfil its obligations to protect world heritage sites instead of making baseless accusations against other members" of UNESCO, he added. Both China and Australia are among the 21 nations on heritage committee, which is evaluating nearly 50 sites that could be added to its more than 1,100 World Heritage list.

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RARE ARCTIC LIGHTNING STORMS STRIKE NORTH OF ALASKA

Relevant for: Environment | Topic: Disaster and disaster management

Unusual storms: These will become less rare with global warming. | Photo Credit: [SLAVICA:iStockphoto](#)

Meteorologists were stunned this week when three successive thunderstorms swept across the icy Arctic from Siberia to north of Alaska, unleashing lightning bolts in an unusual phenomenon that scientists say will become less rare with global warming.

“Forecasters hadn’t seen anything like that before,” said Ed Plumb, a National Weather Service meteorologist in Fairbanks, speaking about the storms that started on Saturday.

Typically, the air over the Arctic Ocean, especially when the water is covered with ice, lacks the convective heat needed to generate lightning storms. But as climate change warms the Arctic faster than the rest of the world, that’s changing, scientists say.

Episodes of summer lightning within the Arctic Circle have tripled since 2010, a trend directly tied to climate change and increasing loss of sea ice in the far north, scientists reported in a March study published in the journal *Geophysical Research Letters*. As sea ice vanishes, more water is able to evaporate, adding moisture to the warming atmosphere.

“It’s going to go with the temperatures,” said co-author Robert Holzworth, an atmospheric physicist at the University of Washington in Seattle.

These electrical storms threaten boreal forests fringing the Arctic, as they spark fires in remote regions already baking under the round-the-clock summer sun.

The paper also documented more frequent lightning over the Arctic’s treeless tundra regions, as well as above the Arctic Ocean and pack ice. In August 2019, lightning even struck within 100 kilometers of the North Pole, the researchers found.

In Alaska alone, thunderstorm activity is on track to increase threefold by the end of the century if current climate trends continue, according to two studies by scientists at the National Center for Atmospheric Research in Boulder, Colorado, published over the last year in the journal *Climate Dynamics*.

“What used to be very rare is now just rare,” said Rick Thoman, a climate scientist with the University of Alaska Fairbanks. As the parade of Arctic storms this week demonstrated, lightning is already appearing in unexpected places, he said. “I have no memory of three consecutive days of this kind of thing” in the Arctic.

On the water, the lightning is an increasing hazard to mariners, and vessel traffic is increasing as sea ice retreats, Holzworth said.

People can become lightning rods and usually try to get low for safety. That’s tough to do on flat tundra or ocean expanse. “What you really need is to pay better attention to the lightning forecasts,” he said.

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This study was completed before the emergence of the Delta variant of SARS-CoV-2 now dominating in the U.K.

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CLIMATE CHANGE HAS ADDED OVER 1,000 LAKES IN SWISS ALPS: STUDY

Relevant for: Environment | Topic: Environmental Degradation - GHGs, Ozone Depletion and Climate Change

Climate change has dramatically altered the Swiss Alp landscape — at a quicker pace than expected — as melting glaciers have created more than 1,000 new lakes across the mountains, a study published on Monday showed.

The inventory of Swiss Glacial lakes showed that almost 1,200 new lakes have formed in formerly glaciated regions of the Swiss Alps since the end of the Little Ice Age around 1850.

Around 1,000 of them still exist today, according to the study published by the Swiss Federal Institute of Aquatic Science and Technology (Eawag).

That is far more than the few hundreds the researchers had expected to find at the beginning of the project.

“We were surprised by the sheer numbers,” Daniel Odermatt, head of the Eawag Remote Sensing Group that carried out the study, said in a statement.

He said the “marked acceleration in formation” was also surprising, pointing out that “180 have been added in the last decade alone”.

Glaciers in the Swiss Alps are in steady decline, losing a full 2% of their volume last year alone, according to an annual study by the Swiss Academies of Science.

And even if the world were to fully implement the 2015 Paris Agreement two-thirds of the Alpine glaciers will likely be lost, according to a 2019 study by the ETH technical university.

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ANALYSIS BY NGO REVEALS MICROPLASTICS IN GANGA

Relevant for: Environment | Topic: Environmental Pollution - Air, Water, Soil & E-waste

An analysis of the stretches of the river Ganga by a Delhi-based environment NGO, Toxics Link, has revealed pollution by microplastics, defined as synthetic solid particles sized ranging from 1 micrometre to 5 millimetre (mm), which are insoluble in water.

The Ganga flows across five States and has been at the centre of a massive multi-crore undertaking by the Union government, in the form of the National Mission for Clean Ganga, to rid it off contamination.

Microplastics are recognised as a major source of marine pollution. Untreated sewage from many cities along the river's course, industrial waste and religious offerings wrapped in non-degradable plastics pile pollutants into the river as it flows through several densely populated cities. The plastic products and waste materials released or dumped in the river break down and are eventually broken down into microparticles. The river finally transports significantly large quantities downstream into the ocean, which is the ultimate sink of all plastics being used by humans.

“Essentially, all along microplastics are flowing into the river system. It does reflect or suggest a direct linkage between the poor state of both solid and liquid waste management; hence it is critically important to initiate steps to remediate it,” Priti Mahesh, chief coordinator at Toxics Link, said in a statement.

The study, ‘Quantitative analysis of Microplastics along River Ganga’, was based on an analysis of water samples at Haridwar, Kanpur and Varanasi.

The highest concentration of such plastic was found at Varanasi, comprising single-use and secondary plastic products. The water testing was carried out in collaboration with the National Institute of Oceanography (NIO) in Goa. The samples were tested to identify the exact type or resin core and the results show the presence of at least 40 different kinds of polymers as microplastics.

The shapes and nature of the observed resins ranged from fibres to fragments, films and beads. Fragments were the predominant shape in all locations, followed by film and fibre.

Microbeads were observed in Varanasi and Kanpur, while no beads were found in Haridwar. “The most frequent size range observed in all the samples was <300 micrometre,” said Dr. Mahua Saha, the lead researcher from NIO.

“We need to address the threat of plastic on aquatic life more realistically and with a futuristic eye. Various stakeholders, including industries, governments and civil society organisations, need to join hands for improving plastic waste management and the reduction in microplastic pollution,” said Satish Sinha, associate director at Toxics Link.

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NITI AAYOG AND IEA LAUNCH 'RENEWABLES INTEGRATION IN INDIA 2021'

Relevant for: Environment | Topic: Environmental Conservation, Sustainable Development, and EIA

A report on "Renewables Integration in India 2021" was jointly launched by Dr. Rakesh Sarwal, Additional Secretary, NITI Aayog & Mr. Keisuke Sadamori, Director of Energy Markets and Security, IEA on 22nd July, 2021. The report is based on the outcome of three states workshops held with the Governments of Maharashtra, Karnataka and Gujarat to understand the specific energy transition challenges faced by these renewable-rich states. The report uses IEA modelling results to show the effects of different flexibility options on the power system.

The report highlights that India's power system can efficiently integrate renewables (175 GW by 2022 and 450 GW by 2030), but it would require identification of resources and proper planning, regulatory, policy and institutional support, energy storage and advance technology initiatives.

Indian states need to employ a wide range of flexibility options – such as demand response, more flexible operation of coal based power plants, storage, and grid improvements – to transition to cleaner electricity systems. Larger shares of renewables can be better managed by shifting time of use in agriculture. Time of Use (ToU) tariffs will be an effective tool to incentivise demand side management and encourage flexible consumption.

Mr. Keisuke Sadamori, the IEA Director of Energy Markets and Security, indicated that the joint report underscores IEA's commitment to provide support to India with its clean energy transition agenda.

Launching the report, Dr. Rakesh Sarwal, Additional Secretary, NITI Aayog, said that the joint report provides useful suggestions for the states to consider to best manage their integration challenge.

Mr. Amitesh Kumar Sinha mentioned that after 2023-24, RE integration will become an issue and could be addressed through supply and demand side measures. He also emphasized the role of distributed solar which will play a major role in reducing integration challenges. Mr. Vivek Kumar Dewangan, Additional Secretary, Ministry of Power said that the report on renewables integration will serve as repository of vast knowledge for stakeholders in India. He highlighted Government's policies on thermal power plant flexibility and strengthening of transmission network through green corridors and stressed on the need for cost effective solutions for storage technologies.

Mr. Dinesh Waghmare, Principal Secretary (Energy), Government of Maharashtra, stated that Ministry of Power proposed Market Based Economic Dispatch (MBED) model for better optimization of scheduling and economic dispatch of generation capacities purely on economic principles which will replace the current practice of Self Scheduling by Discom.

Dr. N Manjula, Managing Director, Karnataka Power Transmission Corporation Limited emphasized that to absorb maximum RE power, State has shifted 70% -80% agriculture load to the day time, providing incentives to industrial consumers for consuming more electricity and increasing State share in the Green Energy Trading (now, approx. 50%). All these measures have helped to reduce the curtailments, which is almost zero now. Government of Karnataka is in the process of bringing in new RE policy.

Mr. K V S Baba, Chairman and Managing Director, POSOCO stated that RE integration can start with proper resources planning and better implementation of technologies, such as Artificial Intelligence, base power system management and smart grid intervention.

Mr. Anand Kumar, Former Chairman, Gujarat Electricity Regulatory Commission was of the view that old regulations needs to be revised and regulatory commissions need to play more proactive role to implement the revised regulations. Smart meters, Time of the Day tariff and overall demand response program would be useful for RE load management.

Sh. Rajnath Ram, Adviser (Energy) concluded the meeting with remarks that the NITI Aayog looks forward to giving continuous support to the state governments in order to support their development plan for affordable, secure and clean power systems of the future.

DS/AKJ

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THE GANGA'S MESSAGE: THE HINDU EDITORIAL ON MICROPLASTICS POLLUTION

Relevant for: Environment | Topic: Environmental Pollution - Air, Water, Soil & E-waste

The Ganga might have stood witness to many stages of India's civilisation, as Mahatma Gandhi once noted, but in recent decades it has become a conduit for sewage, solid waste, industrial effluents and other pollutants. It is depressing, though not surprising, therefore, that a new study by an [NGO has found evidence of a modern-day scourge, microplastics](#), in the river, with the highest concentrations in Varanasi and Kanpur, followed by Haridwar. What the data show is the alarming presence of plastic filaments, fibres, fragments, and in two places, microbeads, with their composition pointing to both industrial and secondary broken-down plastics from articles of everyday use. These range from tyres, clothing, food packaging, bags, cosmetics with microbeads, garland covers and other municipal waste. The finding of significant levels of microscopic particles invisible to the naked eye at below 300 micrometres to 5 millimetres in the country's holiest river calls into question the progress of two high-priority, well-funded missions of the NDA government, [Swachh Bharat](#), to deal with solid waste, and [Namami Gange](#), to rid the river of its pollution. Surprisingly, Prime Minister Narendra Modi's support for the river clean-up, originally scheduled to be implemented by December 2020, has not saved it from serious deficits; official data indicate that 97 Ganga towns may be discharging about 750 million litres of untreated sewage a day into the river. An environmental activist, [Guru Das Agrawal, died in 2018](#) after fasting in protest, and his letter to Mr. Modi did not change the situation.

[Microplastics](#), recorded in recent times in the remotest of places — Mount Everest, Arctic snow, Icelandic glaciers, the French Pyrenees, and the depths of the Mariana Trench, among others — pose a hazard as plastics production outpaces the ability of governments to collect and manage waste. Successive governments issued waste management rules, but dropped the ball on implementation. Although the Centre recently issued a draft to tighten the Plastic Waste Management Rules, cities have failed to implement existing rules as well as the Solid Waste Management rules, on ending single-use plastics, waste segregation, recycling labels on packaging, extended producer responsibility for manufacturers and recovery of materials. Moreover, growing plastic waste will far exceed the capacity of governments to manage it, given that recycling has its limits. Swachh Bharat, therefore, must mean not merely keeping waste out of sight, achieved through costly dumping contracts, but sharply reduced generation, full segregation and recycling. Plastic waste around the world is threatening the food web and the crisis demands a new global treaty modelled on the [Montreal Protocol](#) and the [Paris Agreement](#). India needs to demonstrate that it is serious about a clean-up at home.

[Our code of editorial values](#)

From the abrogation of the special status of Jammu and Kashmir, to the landmark Ayodhya verdict, 2019 proved to be an eventful year.

END

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A CLIMATE RISK: THE HINDU EDITORIAL ON EXTREME WEATHER EVENTS

Relevant for: Environment | Topic: Environmental Conservation, Sustainable Development, and EIA

The monsoon is nearing its halfway mark and July, which is among the rainiest months, began with a rainfall deficit but has since seen a revival. For most of last week, all-India rainfall has been over 50% more than what is normal for this time of the year. Many regions in the Konkan coast and the southern peninsula have been seeing instances of extreme rainfall. According to India Meteorological Department (IMD) data on the regional distribution, the [‘South Peninsula’ has seen 29% more rain](#) from June 1-July 25 than what is normal for this period. Rainfall in Mahabaleshwar, Maharashtra, was torrential enough to beat its all-time record, according to the IMD. The monsoon is characterised by unexpected variability that forecast models can capture only in a limited way. However, much evidence is accumulating that there is a distinctive change in climate patterns. The frequency and the strength of cyclones over the Arabian Sea have increased in the last two decades. There has been a 52% increase in the frequency of cyclones over the Arabian Sea from 2001-2019 and an 8% decrease over the Bay of Bengal compared to 1982-2002, when, historically, most cyclones have been in the Bay of Bengal, according to a new study in *Climate Dynamics*.

Even the duration of these cyclones has increased by 80%. More cyclones are bringing in more moisture from the Arabian Sea and contributing to extreme rainfall events over the western coast, the most recent example being [cyclone Tauktae](#) in May, which at 185 kilometres per hour was among the strongest cyclones to approach Mumbai. They drive storm surges that flood the coast. Studies show that a heating globe has increased atmospheric moisture levels, contributing to short, intense spells of rains. The interaction between warming, rainfall and temperature is complex and variables such as aerosol emissions, particulate matter pollution, agriculture and forestry patterns must be accounted for. However, the broader picture is that extreme events — bursts of torrential localised rainfall and prolonged droughts and heatwaves — are likely to increase, making the role of accurate forecasts that are able to warn of such events at least three to five days ahead even more important. But the bigger challenge is to undertake so-called climate-proofing of the most vulnerable regions and taking warnings of scientific risk assessment seriously. Evacuations ahead of a flood or a cyclone are not always effective and what is needed is limited construction in places that have been marked vulnerable. Just as it is possible to plan earthquake-resilient structures and site them scientifically, but hard to anticipate a major quake, similarly, proper planning can insure against the inevitable extremities of nature. International climate change agreements to limit greenhouse gas emissions will yield benefits only in the very long term but what is done in the near future will mean the difference between surviving and thriving.

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WOUNDED MOUNTAINS: ON HIMACHAL LANDSLIDE TRAGEDY

Relevant for: Environment | Topic: Disaster and disaster management

The [tragic death of nine tourists in a landslip in Kinnaur district](#) of Himachal Pradesh is another pointer to the fragility of the ecology of the Himalayan States. Extraordinarily heavy rain pummelled the State recently, leaving the hill slopes unstable and causing floods in built-up areas including Dharamshala. The descending boulders from destabilised terrain, which crushed a bridge like a matchstick, are a source of worry even for cautious local residents, and for unwary visitors, such as the tourists travelling in a van, they can turn into sudden disaster. Himachal is famed for its scenic vistas and welcoming summer climate, and drew a few hundred thousand tourists in June this year as States began relaxing the controls for COVID-19. There was justified alarm at the prospect of a fresh surge in infections, prompting Chief Minister Jai Ram Thakur to appeal for COVID-appropriate behaviour. Unfortunately, there was not enough vigil against travel to risky areas, in the wake of a disastrous year for tourism, resulting in the mishap in Kinnaur's Basteri area. What should worry Himachal, and neighbouring Uttarakhand, is that the States may be entering a phase of irreversible decline because of losses to their ecology; frequent landslides may become inevitable. Bootstrapping an incompatible model of development in the hills, represented by big hydroelectric projects and large-scale construction activity involving destruction of forests and damming of rivers, is an invitation to harm.

Also read: [Kinnaur in Himachal Pradesh staring at negative impacts of altered land use](#)

Mega hydropower, which Himachal Pradesh is working to tap as a significant source of "green" power that substitutes energy from fossil fuels, could alter several aspects of ecology, rendering it vulnerable to the effects of extreme events such as cloudbursts, flash floods, landslides and earthquakes. The parliamentary Standing Committee on Energy during 2018-19 noted that the State could more than double its existing harnessed hydropower potential of 10,547 MW. Kinnaur is a focus point for such development, centred around the potential of the glacially-fed Sutlej valley, but one scientific estimate warns that avaricious tapping of the river through all planned projects would impound nearly a quarter of its waters in dams, and divert a staggering 72% through tunnels. Other researchers, studying the 2015 Nepal earthquake, point to high seismicity causing fatal landslides and severe damage to hydropower structures in the Himalayas; the cost of power produced was underestimated, while the potential was overestimated. Evidently, it is impossible to assign a real value to the costs to people and communities, together with the loss of pristine forests that weak afforestation programmes cannot replace. As catastrophic weather events inflict frequent, heavy losses, Himachal Pradesh and other Himalayan States can only watch their ecological base erode. Changing course may yet preserve a lot of their natural riches.

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HAZARDOUS CHEMICALS IN UNDERGROUND WATER

Relevant for: Environment | Topic: Environmental Pollution - Air, Water, Soil & E-waste

The Government is aware of the presence of various hazardous chemical contents in ground water at some places in the country. However, Central government has taken a number of initiatives in collaboration with States to provide safe water to the citizens.

Central Ground Water Board (CGWB) generates ground water quality data of the country on a regional scale as part of its ground water quality monitoring program along with various scientific studies.

CGWB studies indicate the occurrence of contaminants such as Fluoride, Arsenic, Nitrate, Iron and heavy metals beyond permissible limits (as per BIS) for human consumption in isolated pockets in various States / UTs. The ground water contamination reported by CGWB is mostly geogenic in nature and does not show significant change over the years. However, nitrate contamination is mostly anthropogenic and its spread has been noticed in some areas, particularly areas adjoining habitations. Nitrate contamination may also be caused by excessive use of fertilizers. State-wise details of contamination of ground water are given at Annexure.

Government of India in partnership with States, is implementing Jal Jeevan Mission (JJM) since August, 2019 to provide potable tap water supply of prescribed quality to every rural household in the country by 2024. Under JJM, while planning water supply schemes to provide tap water supply to households, priority is given to quality-affected habitations. While allocating the funds to States/ UTs in a particular financial year, 10% weightage is given to the population residing in habitations affected by chemical contaminants including Arsenic and Fluoride, as on 31st March of the preceding Financial Year.

Since, planning, implementation and commissioning of piped water supply schemes based on a safe water source likely to take time, States/ UTs have been advised to install community water purification plants (CWPPs) in such habitations, purely as an interim measure, to provide potable water to every household at the rate of 8–10 litre per capita per day to meet their drinking and cooking requirements.

Central Pollution Control Board (CPCB) in association with State Pollution Control Boards/Pollution Control Committees (SPCBs/PCCs) is implementing the provisions of The Water (Prevention & Control) Act, 1974 & The Environment (Protection) Act, 1986 to prevent and control pollution in water.

Under Atal Mission for Rejuvenation and Urban Transformation (AMRUT) launched on 25th June, 2015 in selected 500 cities with focus on development of urban infrastructure in various sectors including water supply. States/UTs have the option to take projects on special water supply arrangements for difficult areas, hill and coastal cities, including those having water quality problems with Arsenic, Fluoride etc.

Under the National Aquifer Mapping Programme (NAQUIM) of CGWB, special attention is being given to the aspect of ground water quality including contamination by toxic substances such as Arsenic in ground water.

CGWB has constructed several exploratory and observation wells in the Country tapping the Arsenic safe deeper aquifer zones delineated through exploration aided detailed aquifer mapping under National Aquifer Mapping programme. Successful wells have been handed over

to the State Governments for their purposeful utilization. Further, CGWB is providing technical assistance to the States by sharing the cement sealing technology for tapping contamination free aquifers in Gangetic flood plains.

This information was given by the Union Minister for Jal Shakti, Shri Gajendra Singh Shekhawat in a written reply in Rajya Sabha today.

AS/SK

Annexure

States Wise Number of Partly Affected Districts with different Contaminants in Ground Water of India

S.

No.

State/ UT

Salinity (EC above 3000 micro mhos/ cm)

(EC : Electrical Conductivity)

Fluoride

(above 1.5 mg/l)

Nitrate

(above 45 mg/l)

Arsenic

(above 0.01 mg/l)

Iron

(above 1mg/l)

Lead (above 0.01 mg/l)

Cadmium (above 0.003 mg/l)

Chromium (above 0.05 mg/l)

1

Andhra Pradesh

12

12

13

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7

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Telangana

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Assam

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Arunachal Pradesh

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Bihar

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Chhattisgarh

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Delhi

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Goa

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Gujarat

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Haryana	
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Jammu & Kashmir	
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Tamil Nadu

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Tripura

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Uttar Pradesh

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West Bengal	
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Andaman & Nicobar	
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Daman & Diu	
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	1
	1
31	
Puducherry	
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Total**Parts of 249 districts in 18 states & UTs****Parts of 370****districts in 23 states & UTs****Parts of 423****districts in 23****states & UTs****Parts of 152 districts in 21 states & UTs****Parts of 341 districts in 27 states & UTs****Pb in parts of 92 districts in 14 states****Cd in parts of 24 districts in 9 states****Cr in parts of 29 districts in 10 states**

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Andhra Pradesh

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Jammu & Kashmir

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Rajasthan

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Tamil Nadu

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Tripura

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Uttar Pradesh

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Uttarakhand

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West Bengal

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6

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Andaman & Nicobar

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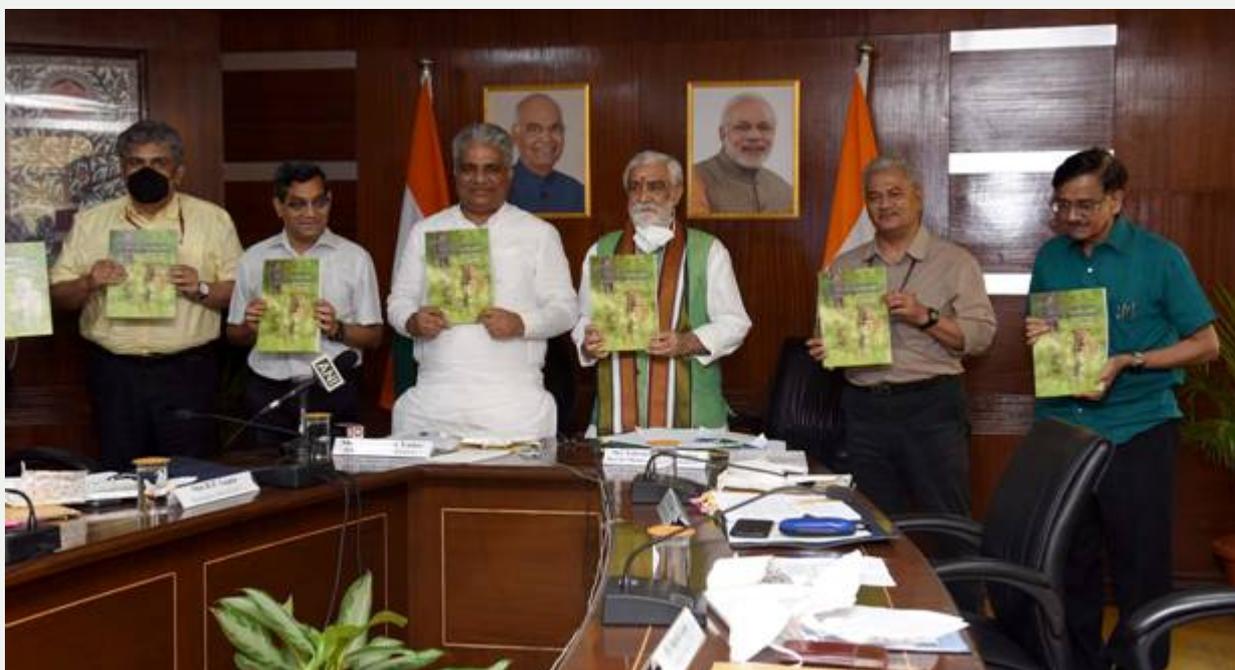
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INDIA'S 14 TIGER RESERVES GET GLOBAL CA/Ts RECOGNITION FOR GOOD TIGER CONSERVATION

Relevant for: Environment | Topic: Biodiversity, Ecology, and Wildlife Related Issues

Minister for Environment, Forest and Climate Change, Shri Bhupendra Yadav today said that Tiger Conservation is a symbol of conservation of forests and under the leadership of Prime Minister Shri Narendra Modi, the approach of the Government of India has been an inclusive one integrating scientific & traditional knowledge along with people's participation which is vital for the conservation of Flora and Fauna of the country. Shri Yadav was speaking at a virtual event on the occasion of Global Tiger Day.

The Environment Minister also released the report 'Status of Leopards, Co-predators and Megaherbivores-2018' stating that the report is a testimony to the fact that conservation of tigers leads to the conservation of entire ecosystem.



During all India tiger estimation 2018, leopard population was also estimated within the forested habitats in tiger occupied states of the country. The overall leopard population in tiger range landscape of India in 2018 was estimated at 12,852 (SE range 12,172 - 13,535). This is a significant increase from the 2014, figure that was 7,910 (SE 6,566-9,181) in forested habitats of 18 tiger bearing states of the country.

The event also showcased, the 14 Tiger Reserves in India which received the accreditation of the Global Conservation Assured|Tiger Standards (CA|TS). The 14 tiger reserves which have been accredited are Manas, Kaziranga and Orang in Assam, Satpura, Kanha and Panna in Madhya Pradesh, Pench in Maharashtra, Valmiki Tiger Reserve in Bihar, Dudhwa in Uttar Pradesh, Sunderbans in West Bengal, Parambikulam in Kerala, Bandipur Tiger Reserve of Karnataka and Mudumalai and Anamalai Tiger Reserve in Tamil Nadu.



Conservation Assured | Tiger Standards (CA|TS) has been agreed upon as accreditation tool by the global coalition of Tiger Range Countries (TRCs) and has been developed by tiger and protected area experts. Officially launched in 2013, it sets minimum standards for effective management of target species and encourages assessment of these standards in relevant conservation areas. CA|TS is a set of criteria which allows tiger sites to check if their management will lead to successful tiger conservation.

The event was also attended by Shri Ashwini Kumar Choubey, Minister of State for Environment who emphasized the age old tradition of living in harmony with nature and all forms of life and said that as a top predator, tiger plays a critical role in maintaining healthy ecosystem and exhorted all to come together and join hands to save our tigers and their natural habitat.

In the presence of both the Ministers, National Tiger Conservation Authority (NTCA) felicitated some of the forest frontline workers as 'BaghRakshaks', to recognize their outstanding contribution towards the protection of tigers and forests. "Our forest force continued to toil day and night; protecting forests and wildlife even during the deadly Covid-19 pandemic" said the Union Environment Minister and congratulated all the frontline forest staff for their undying spirit which continues to protect our natural heritage.



The Government of India took a proactive step to classify forest and wildlife protection as 'essential services' during lockdown. The Country's forest force continued to toil day and night; protecting forests and wildlife even during the deadly Covid-19 pandemic.

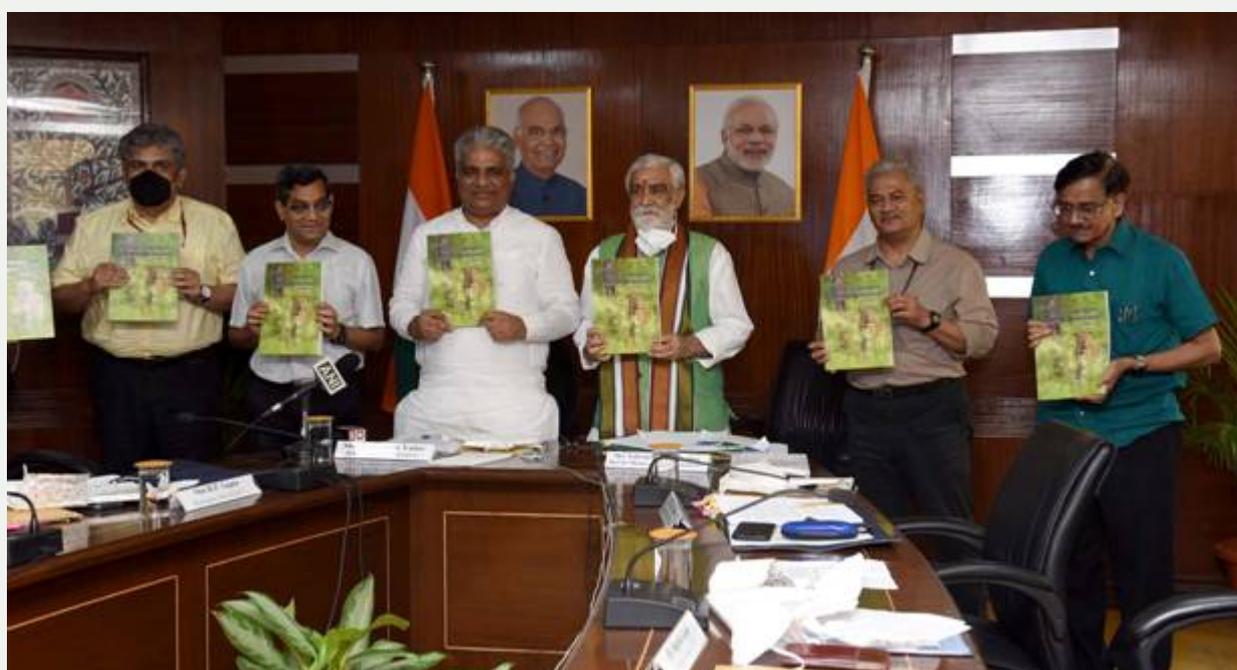
The event also saw the release of a special edition of National Tiger Conservation Authority's (NTCA) quarterly newsletter 'STRIPES', commemorating Global Tiger Day, by both the Ministers, Secretary, Ministry of Environment, Shri R P Gupta and other senior officials of the NTCA.



VRRK/GK

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