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# HUMAN-LEOPARD CONFLICT HAS INCREASED THREEFOLD IN KARNATAKA, FINDS STUDY

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

A study conducted across Karnataka indicates that the policy guidelines brought out by Government of India to mitigate human-leopard conflict and discourage translocation of the animal has had little impact on the ground.

The number of leopards captured per month increased more than threefold (from 1.5 to 4.6) after the human-leopard policy guidelines were brought out in 2011. Similarly, there was a threefold increase in the number of leopards translocated per month (from 1 to 3.5).

Sanjay Gubbi of the Nature Conservation Foundation, who led the study in the State, said the guidelines for human-leopard conflict management were brought out in April 2011 to reduce conflict with leopards, discourage their translocation, and suggest improved ways of handling emergency conflict situations.

Mr. Gubbi, the lead author of the paper, said that in Karnataka, 357 leopards were in conflict situations and were captured between 2009 and 2016, and the final outcome was available in the case of 314 leopards. Of these, 268 were translocated in contravention of the spirit of the policy, 34 were captured and kept in captivity, while 12 died during the capture.

These findings have been published in a paper titled 'Policy to on-ground action: Evaluating a conflict policy guideline for leopards in India' in the *Journal of International Wildlife Law and Policy*. The co-authors of the paper are Aparna Kolekar and Vijaya Kumara.

Taking Karnataka as a case study, the researchers analysed pre- and post-guidelines leopard captures, reasons for the captures, and the outcome for the captured leopards.

The study found that out of 357 leopards captured across 23 of the 30 districts in the State during 2009-16, a majority (79%) occurred in Mysuru, Udupi, Hassan, Tumakuru, Ramanagaram, Ballari, Koppal, and Mandya districts.

Of the 268 leopards translocated, many were moved to protected areas (59.7%) and some to reserved/State/minor forests (29.8%). The highest number of translocations occurred into Bandipur Tiger Reserve (22.5%), followed by Nagarahole Tiger Reserve (20.6%) and Cauvery Wildlife Sanctuary (15%).

The study indicated that of the 80 leopards that were translocated to reserved/State/minor forests, most releases were to Kemphole Reserved Forest (16.2%), followed by Devarayanadurga State Forest (7.5%) and Bukkapatna State Forest (5%).

Though eight reasons were attributed to capture and translocation of leopards, the main justification was livestock depredation (38.1%), said Mr. Gubbi. The other reasons included leopards rescued from snares and wells (15.7%), anxiety caused owing to leopard sightings in human habitations (13.7%), and leopards entering human dwellings (10.9%). Human injuries (4.5%) and human deaths (2%) formed a small part of the reason for leopard captures and translocation.

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# URGENT NEED TO ACCELERATE ACTION TO CONSERVE BIODIVERSITY: INDIA AT UN BIODIVERSITY SUMMIT

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

Representing India at the United Nations(UN) Biodiversity Summit on the occasion of 75<sup>th</sup> anniversary of the UN General Assembly, Union Minister for Environment, Forest and Climate Change, Shri Prakash Javadekar, said that as we are approaching the end of the UN Decade on Biodiversity 2011-2020 there is an urgent need to accelerate action to conserve biodiversity.

The summit is first of its kind ever taken place on Biodiversity in the United Nations General Assembly. The Biodiversity Summit was participated by Head of States/Minister level representing the countries which are party to Convention on Biological Diversity (CBD). The Union Environment addressed the summit virtually.

The full text of the Environment Minister's address is as follows:-

**Excellencies, Ladies and Gentlemen,**

**Excellencies,**

**Excellencies,**

**Excellencies,**

On the occasion of the “75<sup>th</sup> anniversary of the UN” and the start of the “UN Decade of Action and Delivery for Sustainable Development”, lets join our efforts to put nature on a path to recovery and realize the vision of “*living in harmony with nature*”.

**I thank you.**

\*\*\*

GK

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## DUST RESPONSIBLE FOR SNOWMELT AT HIGHER ELEVATION IN WESTERN HIMALAYAN REGION, STUDY SAYS

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

Majestic Himalaya mountain range with forest highway road at Munsiyari Uttarakhand India with view of wild mountain deer | Photo Credit: [Getty Images/iStockphoto](#)

While black carbon has a large effect on snow darkening and resultant melting of snow, dust particles transported from as far as Saudi Arabia that gets deposited in the Western Himalayan Region — Hindu Kush, Karakoram and western Himalaya ranges — has a large role to play in melting of snow, particularly at higher elevations, a [study published](#) in the journal *Nature Climate Change* has found.

This is the first time the role of long-distance transported dust in elevational heterogeneity of snow melting in the Himalayas has been made, says Dr. Chandan Sarangi from the Department of Civil Engineering at IIT Madras, who is one of the corresponding authors of the paper.

Dr. Yun Qian from the the Pacific Northwest National Laboratory (PNNL), Richland, Washington, is the other corresponding author of the paper. The work was done when in collaboration with PNNL, University of Colorado, Boulder and University of California, Los Angeles.

While dust transported as elevated aerosol layers get deposited at 1-5 km elevation, black carbon emission is mostly a surface phenomenon and influences melting of snow from surface to about 3 km elevation.

Based on remote sensing data of spatial distribution of dust aerosol concentration over the Indian subcontinent and dust-induced snow albedo reduction over Himalayas during the period 2011-2016 (March-August) and simulations, the authors show that the relative impacts of dust and black carbon vary with surface elevation of snowpack. This is in addition to snowmelt caused by warming due to climate change.

Earlier studies have shown that the magnitude of snow mass decrease is about 1 mm per year at 1 km elevation, about 5 mm per year at 4.5 km elevation and about 3 mm per year at 6 km elevation.

Though black carbon has a larger snow albedo darkening effect than dust due to a larger mass absorption efficiency, the study found that the radiative effects of dust deposited on snow are comparable to black carbon in the Western Himalayan Region at higher elevations. This is mainly because the deposition of dust by mass is 100-1,000 times more than black carbon.

“As the elevation increases, the influence of dust becomes greater than black carbon, and this coincides with maximum intensity of snowmelt reduction seen at 3-5 km elevation. Between these two, black carbon mainly contributes to snowmelt at lower elevation while dust is the major contributor for snowmelt at higher elevation,” he says.

Westerlies transport dust particles as elevated aerosol layers at maximum intensities mostly during the pre-monsoon period (March to May) and this gets deposited at higher elevations in the western Himalayan region.

“Due to global warming, snow cover at lower elevations in the Himalayas will occur less frequently or totally disappear compared with snow cover at higher elevations. The annual contribution of dust to snowmelt will therefore likely increase in the future as the black carbon effect at lower elevation weakens with dwindling snowpack,” they write.

“Snowmelt is the main source of water for many major Himalayan rivers. Dust deposition during the pre-monsoon period causes early snowmelt water in the Himalayan rivers and a reduction of snowmelt water during peak summer months,” Dr. Sarangi says.

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# STUDY POINTS TO NITROUS OXIDE EMISSIONS DERAILING PARIS CLIMATE ACCORD TEMPERATURE TARGET

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

A farmer spreading fertilizer at a paddy field. Representational image | Photo Credit: [B. VELANKANNI RAJ](#)

Rising nitrous oxide emissions may negate current global attempts to keep temperatures from rising 1.5 degrees Celsius by the turn of the century, and agriculture practices in India, Brazil, China and the United States play a significant role in this, says a study that appeared in the journal *Nature* on Wednesday.

“Current emissions are tracking global temperature increases above 3 degrees Celsius, twice the temperature target of the Paris accord,” said Robert Jackson, Professor and a co-author from Stanford University and chair of the Global Carbon Project.

The growing use of nitrogen fertilizers in the production of food worldwide is increasing concentrations of nitrous oxide in the atmosphere — a greenhouse gas 300 times more potent than carbon dioxide — which remains in the atmosphere longer than a human lifetime.

Nitrous oxide has risen 20% — from 220 parts per billion (ppb) in the pre-industrial era to 331 ppb in 2018 — and its growth has accelerated over recent decades due to emissions from various human activities.

“The atmospheric N<sub>2</sub>O burden increased from 1.4 billion ton in the 1980s to 1.5 billion ton in 2007-2016, with a possible uncertainty of  $\pm 20$  million tons. Our results show a substantial increase in global N<sub>2</sub>O emissions that is primarily driven by anthropogenic sources, as natural sources remained relatively steady throughout the study period,” says the research paper.

Emissions from synthetic fertilizer dominates releases in China, India and the U.S., while emissions from the application of livestock manure as fertilizer dominates releases in Africa and South America, the study found. “The highest growth rates in emissions are found in emerging economies, particularly Brazil, China and India, where crop production and livestock numbers have increased,” said an accompanying press statement.

The failure to include N<sub>2</sub>O within climate mitigation strategies will need even greater abatement of CO<sub>2</sub> and methane (also a greenhouse gas). Although N<sub>2</sub>O mitigation is difficult because nitrogen is the key limiting nutrient in agricultural production, this study demonstrates that effective mitigation actions have reduced emissions in some regions — such as Europe — through technological improvements in industry and improved efficiency of nitrogen use in agriculture.

The significant increase in nitrous oxide was being driven by China, and it was only Europe, as a region, that had successfully tapered emissions, said Dean, School of Biotechnology, Indraprastha University, and chairman of the Indian Nitrogen Assessment (INA) initiative. “India has managed to slow nitrogen emissions growth since 2015 in part due to the *neem*-coating of urea policy that reduced atmospheric loss of the element as well as soil contamination. “However, more needs to be done and there are lessons from Europe on how to go about this,” he told *The Hindu*.

Though agriculture remains the largest contributor to nitrogen emissions, non-agricultural emissions of nitrogen oxides and nitrous oxide were also growing rapidly, with sewage and fossil-fuel burning — for power, transport and industry — leading the trend. Indian Nox (nitrous oxides) emissions grew at 52% from 1991 to 2001 and 69% from 2001 to 2011, the INA had reported in 2018.

Agricultural soils contributed to over 70% of N<sub>2</sub>O emissions from India in 2010, followed by waste water (12%), and residential and commercial activities (6%). Since 2002, N<sub>2</sub>O has replaced methane as the second largest greenhouse gas from Indian agriculture.

Chemical fertilizers (over 82% of it is urea) account for over 77% of all agricultural N<sub>2</sub>O emissions in India, while manure, compost and so on make up the rest. Most of the fertilizers consumed (over 70%) go into the production of cereals, especially rice and wheat, which account for the bulk of N<sub>2</sub>O emissions from India.

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# 14 MILLION TONNES OF MICROPLASTICS ON SEA FLOOR: STUDY

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

In the laboratory, the microplastics were separated from sediment, counted under the microscope, and further analysed using infra-red spectroscopy to determine the plastic types. | Photo Credit: <https://www.manchester.ac.uk>

The world's sea floor is littered with an estimated 14 million tonnes of microplastics, broken down from the masses of rubbish entering the oceans every year, according to Australia's national science agency.

The quantity of the tiny pollutants was 25 times greater than previous localised studies had shown, the agency said, calling it the first global estimate of sea-floor microplastics.

Researchers at the agency, known as CSIRO, used a robotic submarine to collect samples from sites up to 3,000 metres deep, off the South Australian coast.

**Also read:** [How much plastic you consume in a week](#)

“Our research found that the deep ocean is a sink for microplastics,” principal research scientist Denise Hardesty said. “We were surprised to observe high microplastic loads in such a remote location.”

Microplastics in Arctic snow point to widespread air contamination

The scientists, who published their findings in peer-reviewed journal *Frontiers in Marine Science*, said areas with more floating rubbish generally had more microplastic fragments on the sea floor.

“Plastic pollution that ends up in the ocean deteriorates and breaks down, ending up as microplastics,” study lead Justine Barrett said. “The results show microplastics are indeed sinking to the ocean floor.”

Hardesty called for urgent action to find solutions to marine plastic pollution, which affects ecosystems, wildlife and human health. “Government, industry and the community need to work together to significantly reduce the amount of litter we see along our beaches and in our oceans,” she said.

**Also read:** [‘Microplastics found in dolphins’](#)

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# DESPITE DROP IN EMISSIONS, INDIA STILL WORLD'S HIGHEST SULPHUR DIOXIDE PRODUCER

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

In 2019, India emitted 21% of global anthropogenic (human-made) SO<sub>2</sub> emissions, nearly double that of second-ranked global emitter, Russia. [File \(representational image\)](#) | Photo Credit: [N. Rajesh](#)

For the first time in four years India's sulphur dioxide (SO<sub>2</sub>) emissions recorded a significant decline of approximately 6% in 2019 compared to 2018, the steepest drop in four years, according to a report from Greenpeace India and the Centre for Research on Energy and Clean Air (CREA).

However, India continues to occupy the top spot among emitters for the fifth consecutive year.

**Also read:** [India largest SO<sub>2</sub> emitter in world: Greenpeace](#)

The report ranks the world's biggest emitters of SO<sub>2</sub>, a poisonous air pollutant that increases the risk of stroke, heart disease, lung cancer, and premature death.

In 2019, India emitted 21% of global anthropogenic (human-made) SO<sub>2</sub> emissions — or about 5,953 kilotons a year — nearly double that of second-ranked global emitter, Russia at 3,362 kt/year. China occupied the third position at 2,156 kt per annum.

As per the report, the biggest emission hotspots in India, are thermal power stations (or clusters of power stations) at Singrauli, Neyveli, Sipat, Mundra, Korba, Bonda, Tamnar, Talcher, Jharsuguda, Kutch, Surat, Chennai, Ramagundam, Chandrapur, Visakhapatnam and Koradi.

Renewable energy capacity has been increasing in India's power sector, delivering more than two-thirds of the subcontinent's new capacity additions during the FY 2019-20. But most coal plants in India are lacking in flue-gas desulfurization (FGD) technology, which is necessary to scrub emissions clean off sulphur.

**Also read:** [Thermal power plants leading to spike in SO<sub>2</sub>, NO<sub>2</sub>: study](#)

"We are seeing a reduction in SO<sub>2</sub> emissions in the top three emitter countries. In India, we're getting a glimpse of how reduction in coal usage can impact air quality and health. In 2019, renewable energy capacity expanded, coal dependency decreased and we saw a corresponding improvement in air quality," said Avinash Chanchal, Climate Campaigner, Greenpeace India, said in a statement.

"But our air is still far from safe. We must speed up the energy transition away from coal and towards renewables, for our health and economy. While ensuring just transition of energy, with the help of decentralized renewable sources, we need to prioritise access to electricity for the poor," he added.

In 2015, the Ministry of Environment, Forest and Climate Change (MoEF&CC) introduced SO<sub>2</sub> emission limits for coal power stations. But power plants missed the initial deadline of December 2017 for the installation of FGD units. Though the deadline was extended till 2022, as of June 2020 most of the power plants are operating without compliance.

**Also read: [Even low particulate matter pollution is bad for the heart, says study](#)**

The data on sulphur emissions was sourced from the NASA Ozone Monitoring Instrument (OMI), a satellite-based device, that has been monitoring air quality from space since 2004. The device provides the geographical location and rates of emissions for hotspots for each calendar year. The catalogue is used to group the detected sources into four categories: one natural category (volcanoes) and three anthropogenic categories: power plants, oil and gas, and smelters.

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The team used the latest available atmospheric data to simulate how tropical forests might respond to changing rainfall levels.

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## PROUD MOMENT FOR INDIA; ALL 8 BEACHES RECOMMENDED BY GOVERNMENT GETS INTERNATIONAL BLUE FLAG CERTIFICATION: SHRI PRAKASH JAVADEKAR

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

It is a proud moment for India as 8 beaches of India, spread across five states and two union territories, have been awarded the “BLUE FLAG” by an International Jury comprising of eminent members viz UNEP, UNWTO, FEE, IUCN.

The beaches that have been awarded the ‘BLUE FLAG’ are Shivrajpur (Dwarka-Gujarat), Ghoghla (Diu), Kasarkod and Padubidri (Karnataka), Kappad (Kerala), Rushikonda (AP), Golden (Puri-Odisha) and Radhanagar (A&N Islands).

India has also been awarded a 3rd Prize by the International Jury under the “International Best Practices” for pollution control in coastal regions.

“It is an outstanding feat considering that no 'BLUE FLAG' nation has ever been awarded for 8 beaches in a single attempt,” Union Minister of Environment, Forest and Climate Change Shri Prakash Javadekar said in a tweet message adding “this is also a global recognition of India’s conservation and sustainable development efforts”.

Proud moment for India; all 8 beaches recommended by government gets coveted International [#Blueflag](#) Certification. [@narendramodi](#) [pic.twitter.com/j38BTnib10](https://pic.twitter.com/j38BTnib10)

“India is also the first country in “Asia-Pacific” region which has achieved this feat in just about 2 years’ time,” Shri Javadekar further stated in another tweet.

Japan, South Korea and UAE are the only other Asian nations who have been conferred with a couple of Blue Flag beaches, however, in a time frame of about 5 to 6 years!

India is now in the league of 50 “BLUE FLAG” countries and we take pride in this honour to our Nation, planning to taking this journey forward to 100 such beaches in the country in the next five years.

India began its humble journey in 2018 for development of pilot beaches (one each in coastal states/UTs) and presented the first set of 08 beaches for the certification for the ensuing tourist season 2020.

SICOM, MoEFCC, in its pursuit of “Sustainable Development” of the coastal regions of India embarked upon a highly acclaimed & flagship program “BEAMS” (Beach Environment & Aesthetics Management Services) under its ICZM (Integrated Coastal Zone Management) project. This was aimed at striving for the coveted International eco-label “Blue flag”, accorded by The Foundation of Environment Education, FEE Denmark.

The objective of the BEAMS program is to abate pollution in coastal waters & beaches, promote sustainable development of beach amenities/ facilities, protect & conserve coastal ecosystems & natural resources and encourage local authorities & stakeholders to strive and maintain high standards of cleanliness, hygiene, safety and security for beachgoers in accordance with coastal

environment norms & regulations. This program promotes beach tourism and recreation in absolute harmony with nature; and is unique in that sense.

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It is a proud moment for India as 8 beaches of India, spread across five states and two union territories, have been awarded the “BLUE FLAG” by an International Jury comprising of eminent members viz UNEP, UNWTO, FEE, IUCN.

The beaches that have been awarded the ‘BLUE FLAG’ are Shivrajpur (Dwarka-Gujarat), Ghoghla (Diu), Kasarkod and Padubidri (Karnataka), Kappad (Kerala), Rushikonda (AP), Golden (Puri-Odisha) and Radhanagar (A&N Islands).

India has also been awarded a 3rd Prize by the International Jury under the “International Best Practices” for pollution control in coastal regions.

“It is an outstanding feat considering that no 'BLUE FLAG' nation has ever been awarded for 8 beaches in a single attempt,” Union Minister of Environment, Forest and Climate Change Shri Prakash Javadekar said in a tweet message adding “this is also a global recognition of India’s conservation and sustainable development efforts”.

Proud moment for India; all 8 beaches recommended by government gets coveted International [#Blueflag](#) Certification. [@narendramodi pic.twitter.com/j38BTnib0](#)

“India is also the first country in “Asia-Pacific” region which has achieved this feat in just about 2 years’ time,” Shri Javadekar further stated in another tweet.

Japan, South Korea and UAE are the only other Asian nations who have been conferred with a couple of Blue Flag beaches, however, in a time frame of about 5 to 6 years!

India is now in the league of 50 "BLUE FLAG" countries and we take pride in this honour to our Nation, planning to taking this journey forward to 100 such beaches in the country in the next five years.

India began its humble journey in 2018 for development of pilot beaches (one each in coastal states/UTs) and presented the first set of 08 beaches for the certification for the ensuing tourist season 2020.

SICOM, MoEFCC, in its pursuit of “Sustainable Development” of the coastal regions of India embarked upon a highly acclaimed & flagship program “BEAMS” (Beach Environment & Aesthetics Management Services) under its ICZM (Integrated Coastal Zone Management) project. This was aimed at striving for the coveted International eco-label "Blue flag", accorded by The Foundation of Environment Education, FEE Denmark.

The objective of the BEAMS program is to abate pollution in coastal waters & beaches, promote sustainable development of beach amenities/ facilities, protect & conserve coastal ecosystems & natural resources and encourage local authorities & stakeholders to strive and maintain high standards of cleanliness, hygiene, safety and security for beachgoers in accordance with coastal environment norms & regulations. This program promotes beach tourism and recreation in absolute harmony with nature; and is unique in that sense.

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# 'CLIMATE CHANGE TO BLAME FOR DOUBLING OF DISASTERS'

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

Climate change is largely to blame for a near doubling of natural disasters in the past 20 years, the United Nations said on Monday.

The UN Office for Disaster Risk Reduction said 7,348 major disaster events had occurred between 2000 and 2019, claiming 1.23 lives, affecting 4.2 billion people and costing the global economy some \$2.97 trillion.

The figure far outstrips the 4,212 major natural disasters recorded between 1980 and 1999, the UN office said in a new report entitled "The Human Cost of Disasters 2000-2019".

The sharp increase was largely attributable to a rise in climate-related disasters, including extreme weather events like floods, drought and storms, the report said.

Extreme heat is proving especially deadly.

"We are wilfully destructive," UNDRR chief Mami Mizutori told reporters. "That is the only conclusion one can come to when reviewing disaster events over the last 20 years."

She accused governments of not doing enough to prevent climate hazards and called for better preparation for looming disasters.

## 'Uphill battle'

"The odds are being stacked against us when we fail to act on science and early warnings to invest in prevention, climate change adaptation and disaster risk reduction," she said.

The report did not touch on biological hazards and disease-related disasters like the coronavirus pandemic. But Ms. Mizutori suggested coronavirus was "the latest proof that political and business leaders are yet to tune in to the world around them".

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## TOWARDS CLEANER AIR IN DELHI

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

Authorities in New Delhi launched an anti-pollution campaign in an attempt to curb air pollution levels ahead of winter, when the capital is regularly covered in toxic haze, and warned that filthy air could make the coronavirus pandemic more dangerous. | Photo Credit: [AP](#)

Every year, Diwali fireworks blanket Delhi in a haze, compounding air pollution's health risks, particularly to children, the elderly and those with underlying illnesses. The difference this year is that rare respite from pollution as COVID-19 slammed the brakes on economic activity. But with air pollution returning to pre-COVID levels, it is opportune that the Delhi administration has launched a major anti-pollution campaign this month.

The campaign is rightly focused on cutting the deadly smoke from thermal plants and brick kilns in the National Capital Region as well as on chemical treatment of stubble burning from nearby States. Delhi's long-term solution will depend importantly also on abating emissions from transportation. This agenda could cut air pollution from all sources combined by one-quarter to one-third by 2025, which, if sustained, could extend people's lives by two-three years, ameliorating respiratory complications from COVID-19.

Air pollution before COVID-19 was dire. Particulate matter, PM2.5 and PM10, exceed national standards and the more stringent World Health Organization limits. Delhi's toxic air also contains high doses of sulphur dioxide and nitrogen oxide. The lack of wind worsens the pollutant concentration.

Delhi needs a 65% reduction to meet the national standards for PM2.5. Vehicles, including trucks and two-wheelers, contribute 20%-40% of the PM2.5 concentrations. Tackling vehicle emissions would be one part of the agenda, as in comparable situations in Bangkok, Beijing, and Mexico City. A three-part action comprises emissions standards, public transport, and electric vehicles.

The first part is stricter enforcement of emission controls — and a willingness to impose tougher penalties. Two-wheelers and three-wheelers were as important as cars and lorries in Beijing's experience. Bangkok ramped up inspection and maintenance to cut emissions. The first order of business is to implement the national standards. Emission testing of vehicles under Delhi's Pollution Under Control Policy was only 25%.

The second prong is reducing private vehicles on the road by strengthening public transport. Bus Rapid Transit (BRT) systems in Mexico City, Bogota, Istanbul, and Johannesburg show how the sizeable investment cost is more than offset by the benefits, and that financing pays off. Delhi has lessons from its BRT experience in designating better BRT lanes, improving the ticketing system and synchronising with the Metro. The Supreme Court's ruling to increase Delhi's bus fleet and align it with the Metro network must be carried out. The 'odd-even' number plate policy can help, but the system should reduce exemptions, allow a longer implementation period, and complement it with other measures.

The third prong, even if longer term, involves electric vehicles (EVs). Subsidies and investment will be needed to ensure that EVs are used to a meaningful scale, without fossil fuels for charging them. The Delhi government's three-year policy aims to make EVs account for a quarter of the new vehicles registered in the capital by 2024. EVs will gain from purchase incentives, scrappage benefits on older vehicles, loans at favourable interest and a waiver of

road taxes.

Transport solutions need to be one part of pollution abatement that includes industry and agriculture. Delhi's own actions will not work if the pollution from neighbouring States is not addressed head on.

Technical solutions need to be underpinned by coordination and transparency across Central, State, and local governments. Public opinion matters. Citizen participation and the media are vital for sharing the message on pollution and health, using data such as those from the Central Pollution Control Board. It is a matter of prioritising people's health and a brighter future. Once the pandemic is over, Delhi must not stumble into yet another public health emergency. The time to act is now.

Vinod Thomas is Visiting Professor at the National University of Singapore and a former senior vice president at the World Bank. He tweets @vthomas14. This article is based on research with Alyona Seth, Nimrita Singh and Chitranjali Tiwari at the National University of Singapore

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To reassure Indian Muslims, the PM needs to state that the govt. will not conduct an exercise like NRC

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## WATCH

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

The world's sea floor is littered with an estimated [14 million tonnes of microplastics](#), according to Australia's national science agency CSIRO.

Microplastics are tiny plastic particles with an upper size limit of 5mm in diameter. The term 'microplastics' was introduced in the mid-2000s. They occur in the environment as a consequence of plastic pollution.

Every year, several million tonnes of plastic litter course through rivers and out to the oceans, where they are gradually broken down into smaller fragments through the motion of waves and the ultraviolet light of the sun.

Marine organisms such as fish, crabs and prawns consume these microplastics by misidentification as food. Humans consume this seafood which leads to several health complications.

### Primary microplastics

Primary microplastics which enter the environment directly, are tiny particles designed for commercial use, as well as microfibers shed from clothing and other textiles, such as fishing nets.

Examples of primary microplastics include microbeads found in personal care products, plastic pellets used in industrial manufacturing, and plastic fibres used in synthetic textiles.

### Secondary microplastics

Secondary microplastics form from the breakdown of larger plastics such as water bottles.

This typically happens when larger plastics undergo weathering, through exposure to conditions like wave action, wind abrasion, and ultraviolet radiation from sunlight.

**Also read:** [Microplastics in drinking water not a health risk for now, says WHO](#)

Microplastics contribute to [over 80% of the ocean debris](#). In the last four decades, concentrations of these particles appear to have increased significantly in the surface waters of the ocean, according to the UN Environment Programme.

Although a global problem, only 43% of the countries are actively involved in studies on microplastics.

About half the global population lives within 100 km of a coastline, and population growth is greatest in that zone. This means the amount of plastic debris entering the ocean from land-based sources is likely to increase unless significant changes are made to waste management practices on land.

As the world population grows and more products containing microplastics are placed on the market, the amounts of primary microplastics entering the marine and coastal environment is likely to increase.

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The scientists believe these monkeys were probably “jacks of all trades” able to navigate in the trees and on land, and their teeth indicated they could eat a wide variety of plants, fruits and flowers.

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# HOW GLOBAL WARMING MIGHT AFFECT FOOD SECURITY

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

Alarm call: Scientists warn higher temperatures during the 'growing season' in the tropics and sub-tropic regions will greatly affect crop productivity. | Photo Credit: [banjongseal324](#)

Between the year 1870 (the first industrial revolution) and today, the global temperature has risen by almost 2 degrees Celsius. This has come about due to more fossil burning (oil, natural gas, coal), which has also increased the carbon dioxide (abbreviated as CO<sub>2</sub>) levels from 280 ppm to 400 ppm. This heating has caused glaciers (and snow capping mountains) to melt and the sea level to rise. Daniel Glick, in the October 2 issue of *National Geographic Magazine* warns that the glaciers in Garhwal, Uttarakhand may virtually disappear by 2035!

The rise in CO<sub>2</sub> levels has also acidified the ocean, leading to weakening the shells and skeletons of animals living in the sea, [climate.org](#). On land, the rise in CO<sub>2</sub> levels has both positive and negative effects. This being a 'Green House Gas', it traps the Sun's heat from the atmosphere and warms the temperature, aids in the photosynthesis of plants, making them grow more, but at the same time restricts the plant's ability to absorb nitrogen, thus restricting crop growth, [phys.org](#).

How will this CO<sub>2</sub> level heating affect food security in the coming years? D.S. Battisti and R.L. Naylor warned of this in 2009 in their paper in *Science*: "Historical warnings of future food insecurity with unprecedented seasonal heat" <DOI: 10.1126/science.1164363>. They warned that such higher temperatures during the 'growing season' in the tropics and sub-tropic regions (India and our neighbours, Saharan and Sub-Saharan Africa and parts of South America) will greatly affect crop productivity, and that this would be the 'norm'. Given this double whammy of affecting ocean life and food security, it is unpardonable for Donald Trump, president of the US, and Jair Bolsonaro, president of Brazil, to promote industry at the cost of climate change.

How do global rise in temperature and CO<sub>2</sub> level affect plant growth and yield? Do they promote higher yields or do they also lead to stress in the metabolism, generating some negative effects? Can we do some laboratory experiments on a model plant and see what happens at today's (normal) temperature and a 'future' higher one; likewise at today's CO<sub>2</sub> and a 'future' higher level? J. Yu and his colleagues did try such experiments in 2017 in their paper: "Metabolic pathways involved in CO<sub>2</sub> enhanced heat tolerance in Bermuda grass" in the journal *Frontiers in Plant Science* <https://doi.org/10.3389/fpls.2017.01506>. They found that there was improved heat tolerance, and suppressed heat-induced damages. These are interesting results, but on a grass which is good for animals such as rabbits and cattle, and not for humans who do not have ruminant stomachs, nor teeth that grow upon usage as they do.

While grasses are what botanists call C4 plants, food grains (our staple food) are C3 and the way photosynthesis is done is somewhat different. It would thus be useful if such experiments are done on beans and legumes such as chana, chickpeas and similar grains (called 'plant meat').

It is towards this that a group from the Hyderabad Centre of the international agency ICRISAT (International Crops Research Institute for the Semi-Arid Tropics) decided to look at how two kinds of chickpea (the desi chana dal or the Bengal gram and the Kabuli chana (originally from Afghanistan) behave under different CO<sub>2</sub> levels (current level of 380 ppm, and two higher levels

(550 and 700 ppms). The plants were sown under these conditions, and harvested during the vegetative and reproductive stages (15 days and 30 days) post germination. The results of this study titled: 'Molecular and physiological alterations in Chickpea under elevated CO<sub>2</sub> concentrations', by Paramita Palit *et al* in *Plant and Cell Physiology* 61(8):1449-1463 (2020) doi:10.1093/pcp/pcaa007, available online at <https://academic.oup.com/pcp>.

Since the whole genome sequence of the chickpea was earlier published by this group (Varshney *et al*, *Nature Biotechnology* 31,240-246, 2013 <https://doi.org/10.1038/nbt.2491>), they could identify as many as 138 metabolic pathways, mainly involved in sugar/starch metabolism, chlorophyll and secondary metabolite biosynthesis, and could get to decipher the pathways that lead to how high CO<sub>2</sub> levels modify the growth of the chickpea plants. They found a noted increase in the root and shoot (plant height) lengths. Also the number of nodules in the roots (where nitrogen-fixing bacteria live) changed at high CO<sub>2</sub> levels. Note that decrease in chlorophyll synthesis hastens leaves turning yellow and plant ageing (senescence).

Interestingly, the group found that desi chana and kabuli chana responded differently at high CO<sub>2</sub> levels. This needs to be explored further.

Now, given the details of the 138 metabolic pathways identified, one can look deeper into how we can use molecules or agents that can promote or inhibit specific pathways through which growth and yields can be increased, and also the type of legumes that will best suit local conditions. Now that Nobelists J. Doudna and E. Charpentier have shown us how to edit genes, perhaps the time has come to do this too on specific local legumes!

dbala@lvpei.org

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In the backdrop of the multi-agency investigation into actor Sushant Singh Rajput's death, the role of digital forensics science has come to the fore

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## MORE THAN 80% OF EUROPE'S NATURAL HABITATS IN POOR SHAPE: REPORT

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

Activist build a tree house during a protest against the pending deforestation for the expansion of the A49 highway on October 04, 2020 in Dannenrod, Germany. | Photo Credit: [Getty Images](#)

More than 80% of the European Union's natural habitats are in poor or bad condition and more must be done to protect them, the European Environment Agency (EEA) warned in a report Monday.

The report, which covers the period 2013-2018, shows a deterioration from the 2007-2012 period when 77% of natural habitats were in “unfavourable” condition.

“We clearly need a large-scale restoration in Europe,” one of the authors of the report, EEA expert Carlos Romao, told reporters. “This is a must not only for biodiversity but also for the climate change agenda.”

Common farmland species such as the skylark, and habitats such as wet heaths, are declining across the continent. Habitats and species are facing numerous pressures, including intensive agriculture, urban sprawl — coupled with tourism and recreation — unsustainable forestry activities, and pollution, among others.

Climate change, with increasing drought and decreasing rainfall, also poses a challenge.

In the six-year study, the EEA registered over 67,000 types of human activities that harmed the environment in the 28 EU member states, including Britain.

Less than half of bird species in the EU, 47%, have a “good” conservation status, 5% points fewer than in the previous 2007-2012 reporting period.

Habitats important to pollinators are another area of concern, as they are crucial to the planet's biodiversity. Their conservation status has deteriorated more than others, the report showed.

But the conclusions are not all dire.

The number of animal species whose conservation status was “good” was 27 %, which, while low, was 4% points higher than in the previous study. And conservation efforts are paying off.

Natural habitats covered by the EU's *Natura 2000* network are doing better than other habitats, the EEA said.

As a result, a number of species and habitats have improved, such as the agile frog in Sweden, coastal lagoons in France and the bearded vulture across the EU.

The areas protected by *Natura 2000* covered 18% of EU land, unchanged from 2012, and 10% of marine areas, up by 4% points.

Danish environmental group Noah, a member of the “Friends of the Earth” umbrella organisation, said however that this was not enough. “At least 30% of land and 30% of marine

areas in the EU should be protected by law, and environmental corridors should be made a part of a real trans-European nature network," it said in a study in early October.

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The harmless, insectivorous lizards are found across the country in every bio-geographic zone

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## CELEBRATING SKINKS, ZOOLOGICAL SURVEY OF INDIA LISTS 62 SPECIES

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

Bronzed Grass Skink (left) and the Sand Skink. Photo: Zoological Survey of India

With long bodies, relatively small or no legs, no pronounced neck and glossy scales, skinks are common reptiles around homes, garages, and open spaces such as parks and school playgrounds, and around lakes. Although they are common reptiles and have a prominent role in maintaining ecosystems, not much is known about their breeding habits, and ecology because identification of the species can be confusing.

A recent publication by the Zoological Survey of India (ZSI) reveals that India is home to 62 species of skinks and says about 57% of all the skinks found in India (33 species) are endemic.

The publication, *Skinks of India*, was released earlier this month by Union Minister of State, Ministry of Environment Forest and Climate Change Babul Supriyo.

“It is the first monograph on this group of lizards, which are found in all kinds of habitats in the country, from the Himalayas to the coasts and from dense forests to the deserts,” Kaushik Deuti, scientist of ZSI and one of the authors of the publication, said.

Director ZSI Kailash Chandra, said while a lot of work is done on other groups of reptiles like snakes or geckos, skinks are an ignored species.

Skinks are highly alert, agile and fast moving and actively forage for a variety of insects and small invertebrates. The reduced limbs of certain skink species or the complete lack of them make their slithering movements resemble those of snakes, leading people to have incorrect notion that they are venomous. This results in several of these harmless creatures being killed.

“The publication is a result of four years of work and study of over 4,000 specimens in all 16 regional centres of ZSI and also at the Bombay Natural History Society, Indian Institute of Science, Wildlife Institute of India, and the Salim Ali Centre for Ornithology & Natural History. It also makes an attempt to ‘re-describe’ all the 62 species with their taxonomic identification keys, distributional maps, habits, habitat and breeding biology,” Dr. Chandra said.

The book also gives a phylogenetic and bio-geographical analysis of distribution of these species in all the 11 bio-geographic zones of India and a detailed account on the historical studies on this group of lizards from the British era to the present.

The Western Ghats are home to 24 species of which 18 are endemic to the region. The Deccan Peninsular region is home to 19 species of which 13 are endemic. There are records of 14 skink species from the northeast of which two species are endemic.

Dr Deuti, however, pointed out that with 1,602 species of skinks across the world, making it the largest family of lizards, their occurrence in India is less than 4 % of the global diversity.

Of the 16 genera of skinks found in India, four genera are endemic. *Sepsophis* (with one species) and *Barkudia* (with two species) are limbless skinks found in the hills and coastal plains of the eastern coast. *Barkudia insularis* believed to be found only in the Barkud Island in Chilka

lake in Odisha. *Barkudia melanosticta* is endemic to Visakhapatnam. *Sepsophis punctatus* is endemic to the northern part of Eastern Ghats. Five species of *Kaestlea* (blue-tailed ground skinks) are endemic to the Western Ghats and four species of *Ristella* (Cat skinks) also endemic to the southern part of Western Ghats.

Other authors of the publication, Achyuthan Srikanthan from the Indian Institute of Science, Bengaluru, and three other ZSI researchers — Sujoy Raha, Probhat Bag and Sudipta Debnath — said that alongside its taxonomic significance, the book will generate interest among nature enthusiasts and lay people about skinks.

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## ICE LOSS TO ADD 0.4 DEGREES CELSIUS TO GLOBAL TEMPERATURES: STUDY

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

Arctic summer sea ice levels have declined by more than 10% each decade since the late 1970s and mountain glaciers have shed roughly 250 billion tonnes of ice annually over the last century.

| Photo Credit: [REUTERS](#)

The loss of billions of tonnes of ice from Earth's frozen spaces is likely to increase global temperatures by an additional 0.4 degrees Celsius, according to research Tuesday highlighting the danger of a "vicious circle" of warming.

Arctic summer sea ice levels have declined by more than 10% each decade since the late 1970s and mountain glaciers have shed roughly 250 billion tonnes of ice annually over the last century.

Also Read | [Record melt: Greenland lost 586 billion tonnes of ice in 2019](#)

Ice loss from the West Antarctic and Greenland ice sheets is accelerating and already outstripping what scientists until recently believed to be the worst-case melt scenarios.

Decades of studies have sought to quantify how Earth's melting ice will contribute to sea level rise — Antarctica and Greenland alone contain enough frozen water to boost oceans' height by around 60 metres.

But little research has tried to predict how ice loss will add to the already 1.0 degree C of global warming emissions from fossil fuels since the start of the Industrial Era.

Scientists at Germany's Potsdam Institute for Climate Impact Research (PIK) used a climate model that includes components on atmosphere, ocean, sea- and land-ice data to predict temperature change from ice loss under a variety of emissions scenarios.

Also Read | [Study sounds the alarm for Arctic ice](#)

They found that under current levels of atmospheric CO<sub>2</sub> — roughly 400 parts per million — the melting of Arctic sea ice, mountain glaciers and the polar ice caps would raise temperatures by 0.4C.

That's on top of the 1.5C of warming our current emissions levels have rendered all but inevitable, and the safer cap on global warming aimed for in the Paris climate accord.

The main driver of temperature gain from ice loss would be due to a process known as albedo feedback, in which heat reflective bright ice is replaced by absorbant darker sea water and/or soil.

"If global ice masses shrink, this changes how much of the sunlight that hits the Earth's surface is reflected back into space," said lead author Nico Wunderling.

Also Read | ['Artificial snow' could save stricken Antarctic ice sheet, says study](#)

He likened the albedo effect to wearing either white or black clothes in summer.

“If you wear dark, you heat up more easily,” Mr. Wunderling noted.

This is one of Earth’s so-called climate “feedback loops”, in which increased temperatures lead to further ice loss, which in turn further increases temperatures.

Other ways that temperatures would rise further as ice receded include increased water vapour in the atmosphere, increasing the greenhouse effects, said authors of the study published in Nature Communications.

Looking solely at Arctic sea ice — which unlike polar ice caps might be totally absent during summer months within decades — they found its melt would contribute 0.2C to global temperatures alone.

Also Read | [Arctic ice melt is disrupting key ocean current, may alter climate in Western Europe: Study](#)

The largest ice masses in Greenland and West Antarctica, by comparison, are huge and will likely take centuries to melt fully even if emissions continue their unabated growth.

But the authors highlighted the risk that those enormous bodies of frozen water could soon reach a point of no return as temperatures creep ever higher.

Given the unknowns surrounding ice cap tipping points, Mr. Wunderling told *AFP* it would be best to act in “a risk-averse” way and try to drag down emissions as soon as possible.

Also Read | [Data: Sea ice extent in Arctic lowest in July since 1979; in Antarctic, it surpassed average level in Sept.](#)

“With continued global warming, it becomes more and more likely that we cross tipping points -- not just in the ice-sheets, but also in other parts of the climate system,” he said.

“If the Paris Agreement is fulfilled we can avoid many of the strongest and potentially irreversible impacts on Earth’s ice masses, the global climate and humanity.”

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There is a need for preemptive spatial planning of protected areas for the long-term viability of the species, says lead author

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## LESS POLLUTION, MORE SOIL FERTILITY

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

A farmer burns paddy stubble in Patiala on October 22, 2020. | Photo Credit: [PTI](#)

Stubble burning refers to the practice of farmers setting fire to plant debris that remain in farms after harvest. Before the 1980s, farmers used to till the remaining debris back into the soil after harvesting the crops manually. The origin of stubble burning can be traced to the advent of the Green Revolution and mechanised harvesting, which utilised the combined harvesting technique. The Green Revolution increased greatly rice and wheat production, which simultaneously increased stubble post harvest. However, the popular combined harvesting technique was not efficacious, as machines left behind one-foot-tall stalks. This prompted stubble burning as a low-cost and speedy solution available to farmers due to the limited time period of 20-25 days between harvesting one crop and sowing another.

Stubble burning is practised predominantly by farmers in north India. It releases harmful gases including nitrogen oxide and carbon monoxide into the atmosphere. In recent years, this practice has created vast smoke blankets across the Indo-Gangetic Plain and numerous neighbouring States, including Delhi. This directly exposes millions of people to air pollution. As per a TERI (The Energy and Resources Institute) report, in 2019 the air pollution in New Delhi and other parts of north India was 20 times higher than the safe threshold level as prescribed by the World Health Organization. Stubble burning also has a deleterious impact on soil fertility, destroys organic fertilizers and reduces ground water levels. Stubble burning during a pandemic could worsen the situation by making lungs weaker and people more susceptible to disease. It could also impact those recovering from infection.

### Centre promises law to check stubble burning

In 2013, stubble burning was banned by the Punjab government. In 2015, the National Green Tribunal imposed a ban on stubble burning in Rajasthan, Uttar Pradesh, Haryana and Punjab and directed government to assist farmers by obtaining equipment like happy seeders and rotavator. Stubble burning is an offence under Section 188 of the Indian Penal Code and the Air (Prevention and Control of Pollution) Act of 1981.

Recently, in *Aditya Dubey v. Union of India*, the Supreme Court appointed retired apex court judge Justice Madan B. Lokur as a one-man committee to monitor and provide steps to prevent stubble burning activities in Punjab, Haryana and U.P. Haryana submitted that numerous steps are taken to curb stubble burning in Punjab and Haryana, including the development of an app to detect and notify authorities about stubble burning committed in a particular field. Now the Union government has brought out an ordinance to set up a permanent commission for air quality management, which will replace the Justice Madan B. Lokur Commission.

A revolution in timely stubble removal is the need of the hour. The action plan of Punjab and Haryana appears to focus more on setting up Custom Hiring Centres which will facilitate farmers removing stubble by providing them with machinery such as the happy seeder, rotavator, paddy straw chopper, etc. on rent along with the supply of more balers. As per a study by the International Maize and Wheat Improvement Centre, the application of happy seeders and super SMS machines can improve agricultural productivity by 10% to 15% while reducing labour costs and allowing the soil to become more fertile.

### Centre sets up permanent Commission to tackle air pollution in Delhi territory

This year, the Union government is testing an innovative method, the PUSA Decomposer, developed at the Indian Agricultural Research Institute, Pusa. The [PUSA Decomposer](#) is a set of four tablets made by extracting fungi strains that help the paddy straw to decompose at a much faster rate than usual, giving farmers the option to shred the straw, spray a solution containing the fungal strains, and mix it with the soil for decomposition. If methods such as this become successful, it will be a new revolution in farming. This has the potential to both reduce air pollution and increase soil fertility.

*Varun Varma is an advocate practising before the Supreme Court*

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To reassure Indian Muslims, the PM needs to state that the govt. will not conduct an exercise like NRC

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