

16-30 NOVEMBER, 2024

# DownTo Earth

POLITICS OF DEVELOPMENT ENVIRONMENT AND HEALTH

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## LITTLE WINS

The Convention on Biological Diversity has created a voluntary fund to compensate communities for using digitised data of their genetic resources. Will it help?



CARBON CREDIT

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ORIGINS OF INDIAN ENVIRONMENTALISM

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SCHOOL OF WATER

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One of the ambitious targets that India's Jal Jeevan Mission (JJM) has been working towards is that of connecting every rural household in the country by the end of this year (2024) with a functional tap supplying 55 litre of water per capita per day. The JJM dashboard says that almost 79 per cent of houses in rural India now receive water from their household taps.

If the target is achieved fully, it would mean a family of six will use up about 330 litre of water every day. As per a thumb rule, 70 per cent of water used for washing and bathing and in kitchens comes out as greywater -- this means every 100 litre of water used will give rise to 70 litre of greywater. Once all the 194 million households get a functional tap, the amount of greywater generated will be mind boggling! What's more, this does not include the greywater generated due to unofficial use of groundwater extracted through borewells and tubewells.

The huge amounts of greywater that will be actually generated can completely swamp entire areas, clog all drains and outlets, and pollute neighbouring waterbodies as well as the land. In today's climate-risked world, where severe water crisis is becoming a reality, this greywater can be used as a resource – it can be treated and utilised to recharge the groundwater. Centre for Science and Environment (CSE) invites you to apply for a short online training programme that can tell you just how to do it.

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- Planning tools to manage greywater in rural areas
- Greywater treatment-technology selection matrix
- Tools for planning and designing treatment systems
- Conveyance options for carrying greywater
- Technical brief on treatment technologies at cluster and village level
- Reuse of treated greywater
- Case studies

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# Trump 2.0 is not a fluke

**W**HAT DOES the second coming of Donald Trump mean for climate change action? Here is a man, who will take over as the president of the US, the world's single largest historical emitter of greenhouse gases and the second highest annual contributor. He is an avowed climate sceptic—an out and out advocate for fossil fuels and in a time of climate crisis. He has said he will, once sworn into office, ensure that energy prices are slashed; he will rescind green energy plans; and wants industry to go back to the time of “drill baby drill”—essentially opening more federal lands to exploration for oil and natural gas and slashing regulatory controls on his country's fossil fuel industry. But when I say this, we must note that even under the incumbent president Joe Biden, the US has been the fossil fuel emperor—producing more oil than any country has done before. It is the world's largest producer of oil and gas—outproducing even Russia by over 40 per cent. So, when Trump says he will go back to fossils, we must understand just how bad this will be!

Trump has also railed against the Biden administration's plans for renewable power and electric vehicles, calling them “industry-killing; job-killing; pro-China; and anti-America”. All in all, he wants to go back to the business of the past; rejecting completely the idea that the green transition is necessary as the world stands on a precipice of impending disaster.

The question then is what next for climate change action in the US? What next for international agreements that bring the world together to combat climate change? We need to ask this because this time, Trump's victory is not a fluke—in 2016, when he was elected as president, the US and the world were uncertain what he stood for and against. Most of us thought it was just bluster. This time, he has come to power with the conviction that his people—the people of the US—want him because of his positions, including the strident denial of climate change. So, we should not be surprised by his actions; instead, the question should be how the world moves ahead to take steps to combat this runaway existential problem.

The fact is that Biden—despite the hypocrisy of his country's massive oil and gas production—stood different from all his predecessors on commitment to climate action. He set a bold target of reducing greenhouse gases 50-52 per cent below the 2005 levels by 2030; and to reach 100 per cent carbon pollution-

free electricity by 2035. The Inflation Reduction Act (IRA) was brilliantly conceived to become the driver of investment into clean technologies and green energy. More than anything, US leadership meant that all countries had nowhere to hide—they were pushed to set targets on reducing greenhouse gas emissions and there was some concerted action as well. Not enough. Not nearly. But the narrative had changed.

The question also is if Trump will pull his country out of the global agreements on climate change—the 2015 Paris Agreement and the UN Framework Convention on Climate Change. It is widely held that he will. All this will weaken the global intent for decarbonisation and for building that cooperative agreement so that countries in the South get financial support for mitigation and adaptation.

This is then the reality that we need to contend with. But let's be clear that all this will happen at a time when the impacts of climate change will grow and devastate more and more countries; people will get more desperately poor and this will add to the insecurity of the world. In today's world, immigration is the driver of the shift towards strong leaders that will keep out the illegals. This will only worsen as climate impacts intensify. These downward spirals need all of us to act; need global leadership but also strong voices to speak up, not just of the impending doom but also of the possibility of doing things differently. This is the message of hope we need today.

The world has no doubt moved ahead on its journey to build a low-carbon economy and this cannot be reversed so easily. There has been huge investment in green technologies, including batteries and renewable energy, and now there is an interest in this new economy. But this said, we need a reboot in the way we in the environmental field have espoused our cause; we need to understand the cost of combatting climate change. We need new ways towards the green transition, which is affordable and inclusive—not just in the countries of the South but also in the industrialised North. This is the message we need to take from Trump's election—it's loud and clear and we can ignore it at our common peril. [DTE](#) [@sunitanar](#)

**The world should not be surprised by Donald Trump's actions as president of the US. Instead, it must move ahead to take steps to combat climate change**

# DownToEarth

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**Vol 33, No 13; Total No of Pages: 60**

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29956110, 29956394, 29956399 | Fax: 91-11-29955879.  
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in any manner is prohibited. Printed and published by  
Richard Mahapatra on behalf of Society for Environmental  
Communications. Printed at International Print-o-Pac  
Limited, B-204, 205, Okhla Industrial Area, Phase I,  
New Delhi-110020, India, and published at  
41, Tughlakabad Institutional Area, New Delhi 110 062.

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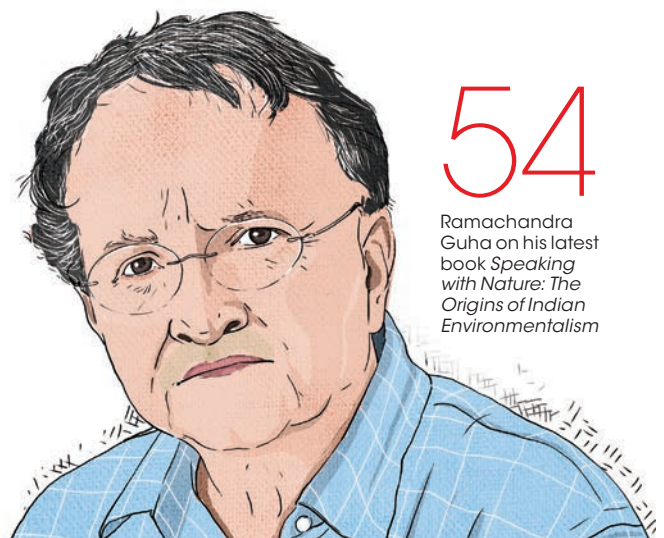
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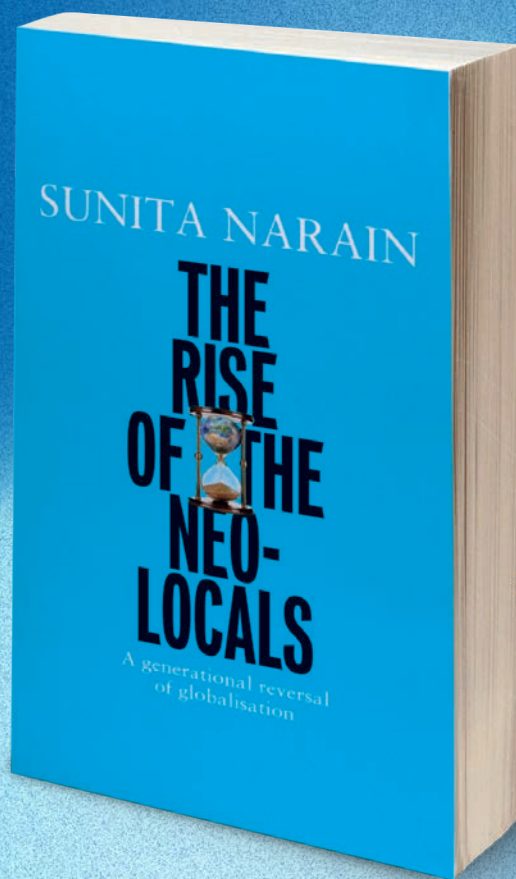


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54 Ramachandra Guha on his latest book *Speaking with Nature: The Origins of Indian Environmentalism*





Over the past half-century, the world has moved from post-colonisation to globalisation and now, to de-globalisation. The proponents of free trade are turning towards protectionism.

What does this mean for the world that faces the existential threat of climate change, combined with increased marginalisation of the poor and the anger of the rich?

And all this at a time when the world is losing the war against climate change to many other wars – from Russia's invasion of Ukraine to the conflict in Gaza to the angst against China for its domination of green technologies.

Born in the pre-globalisation era, environmentalist Sunita Narain argues that the developments of the past four decades, including India's environmental movements, the climate emergency, the sweeping protests and the rise of centre-right political forces, indicate that localisation may herald a new norm.

And it may not be an entirely undesirable situation.

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# Engage



## Realities of Chipko

Apropos “Many myths of Chipko” (16-30 September, 2024), the write-up critically re-evaluates the popular perceptions and themes of the Chipko movement. It challenges the oversimplified image of the movement as purely ecological or feminist, asserting that these interpretations emerged later, overshadowing the original goal of securing local communities’ rights over forest resources. The article rightly highlights that while women played a significant role, it was not a gender-exclusive movement, and its primary focus was on economic and environmental justice for all, not just on stopping deforestation.

While some known environmentalists are often credited as the leaders of the Chipko movement, several local figures played crucial roles, particularly women such as Gaura Devi of Reni village, who is notably recognised for leading a group of women in 1974 to protect trees from commercial logging. Gaura Devi, Sudesha Devi, Bachni Devi, Jhabri Devi and Saunpa Devi, along with others, became the backbone of the movement. These women mobilised local communities and ensured the success of Chipko’s grassroots efforts, which were primarily about securing forest rights for local populations. An excellent coverage indeed.

**RBS RAWAT**  
**GOPESHWAR**

## Replace landfills with waste-to-energy plants

India is known to be one of the filthiest, most polluted countries in the world. Why have we not sorted the problem by building waste-to-energy plants, like China? The country has 400 such plants, which includes the world’s largest. In fact, there are over 2,700 waste-to-energy plants operating worldwide, Europe has more than 500 waste-to-energy plants and the UK has about 57. Meanwhile, India sends its people to Dubai to build these plants instead of constructing them here.

The solution to India’s waste problem lies in replacing landfills with waste-to-energy plants, which must be built in every district. Landfills create poverty, destroy communities, spread diseases and crime. According to estimates by the government, the country has the potential to generate 5,690 MW of power from waste, but as of May 2023, only 556 MW has been installed.

**HABIBUR RAHMAN**  
**VIA EMAIL**

## Focus more on urban trees and forests

I am a regular reader of *Down To Earth* and the magazine is coming out with great editions. However, I want to see one topic covered more extensively in the magazine—trees and forests. I would like to see reviews of urban forests and learn how individuals can grow plants around their areas and in the middle of the ever-expanding roads.

For example, Karnataka’s Saalumurada Thimmakka, a Padma Shri awardee, has planted trees on the sides of the road in her village. We, too, should learn how to do that. I would like to see in the magazine articles on development versus devastation of trees in cities as well.

**AKSHATA**  
**VIA EMAIL**

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# Digest

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Planet to cross 1.5°C warming threshold this year **P11**

What Donald Trump's win means for global climate action **P12**

1,000 WORDS

VIKAS CHOUDHARY



In the mountainous areas of Uttarakhand, where agriculture has suffered due to reasons such as small and fragmented landholdings and forced migration of the youth to the plains, households are increasingly opting for handheld power tillers in recent years. In Bageshwar district, which experiences a high rate of migration, residents say that women and elderly who usually stay behind are now able to take up cultivation in their terrace farms using the mini-tillers. Since 2020, the government has been offering 80 per cent subsidy on the purchase of power tillers to small farmers in mountainous areas of the state.

FOR MORE PHOTOS, SCAN





# Seed guardians

**A MOTHER** of two, Jayashree Shirdhone of Shedshal village is perpetually concerned about the health of her family, especially with regard to the food they eat. Her worries grew when she learned about the excess use of chemicals in hybrid varieties of food grains and vegetables from Shamshadbi Pathan, another resident of the village, located in Maharashtra's Kolhapur district, known for sugarcane cultivation. It is then that Shirdhone, Pathan and other women from the village, decided to preserve and promote seeds of native crop varieties that do not need much chemicals. "These are the varieties that are resistant to pests and diseases and can provide stable crop yields," says Pathan.

In 2019, their efforts resulted in the formation of "Late Appasaheb alias Sa Re Patil Desi Beej Bank", which stores the seeds of over 50 varieties of indigenous foodgrains and vegetables like kidney beans, tomato and brinjal. Pathan, who is now the president of the seed bank, says, "We were motivated to start the initiative after watching videos of Rahibai Popere, referred to as the 'seed mother' of Maharashtra." Known for an extraordinary understanding of crop diversity and conservation of native plant varieties, Popere helps farmers practice sustainable agriculture. "We were able to source some seeds of indigenous crops

Women in a Kolhapur village preserve and promote seeds of native crop varieties

**SHEKHAR PAIGUDE**

from Popere with the help of a sugar factory owner in the region, and set up the seed bank in a small rented room in the village," recalls Pathan.

Now the bank has grown in size and is being managed by 130 women who have formed self-help groups. "The seed bank operates on a give-and-take mechanism. People borrow seeds from the bank, depending on their requirement during different seasons, grow in their backyard and then return a little extra than what they had borrowed for further distribution," explains Shirdhone.

The seed bank has also come to the aid of farmers in the village. "Salinity had damaged my 1.2 hectares of land, and it took a lot of effort to reclaim it. To maintain the soil health, I borrowed indigenous *tur* (pigeon pea) seeds from the seed bank. Though the yield was low, the crop helped me maintain my reclaimed land," says Sunil Suryavanshi, a farmer from the village. "Most are still apprehensive about the duration and yield of the native crop varieties. Yet, there is a growing demand for our seeds. In recent years, farmers from other districts of Maharashtra like Latur, Ahilyanagar and from bordering districts in Karnataka have approached us for the indigenous seeds. But we always lend the seeds, never sell them," says Pathan.

Women of Shedshal village in Kolhapur, Maharashtra have preserved more than 50 indigenous seed varieties in their seed bank



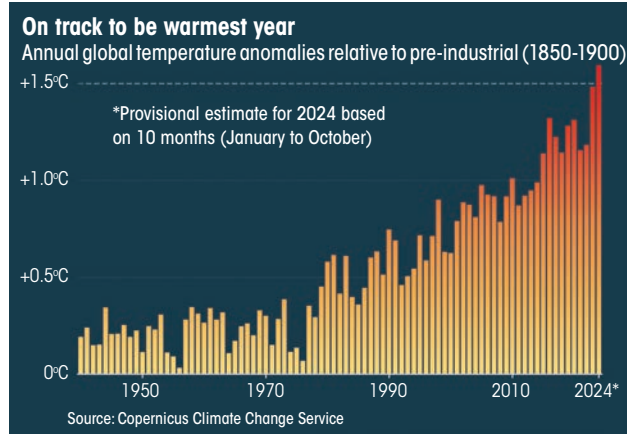


**EXTREME WEATHER**

## 2024 to cross 1.5°C threshold

**THE YEAR** 2024 is well on its way to become the hottest year since the pre-industrial period, as per the World Meteorological Organization (WMO) and EU's Copernicus Climate Change Service (C3S). The year is also on track to be the first year when the global temperature breaches the 1.5°C warming threshold above the pre-industrial levels, says C3S; the year 2023 was 1.48°C warmer.

"This marks a new milestone in global temperature records and should serve as a catalyst



to raise ambition for the upcoming Climate Change Conference, COP29," says Samantha Burgess, deputy director of C3S. The oceans were

also much warmer-than-normal. In October, the average sea surface temperature was 20.68°C, the second warmest since the pre-industrial

period. Warm atmosphere and oceans have led to an increase in moisture levels in the atmosphere which can be evidenced by the extreme events globally. These include the floods in Spain in late October and early November that killed over 200 people, hurricane Milton in Gulf of Mexico that showed explosive rapid intensification and battered the US state of Florida, and the unusual cyclone Asna that formed and intensified on land in late August and caused heavy rainfall in India.

**FOOD**

## Lead in turmeric sold in India, Nepal, Pakistan: study

**LEAD LEVELS** in turmeric sold in India, Nepal and Pakistan were several times higher than the regulatory limit, says a study. Turmeric samples from India's Patna, and Pakistan's Karachi and Peshawar had lead levels exceeding 1,000 microgram/gram (µg/g), the study published in *Science of the Total Environment* found. Guwahati and Chennai also saw levels exceeding the regulatory limits set by the Food Safety and Standards Authority of India (FSSAI). Polished turmeric roots were found to be most contaminated, followed by loose powder, packaged branded powder and unpolished roots. "Consuming turmeric with lead at these levels would likely contribute to lead poisoning across the region, particularly for children," the researchers wrote in their study. Lead is a heavy metal known to mimic calcium, which is stored in bone. It interrupts metabolic processes in humans, impacting intelligence and increasing the risk of heart disease, kidney failure and premature death.

**GENDER**

## Haryana records lowest sex ratio in 8 years

**HARYANA'S SEX** ratio at birth has dropped to its lowest level in eight years, recorded at 905 for the first ten months of 2024. This marks a decrease of 11 points from the previous year, nearing levels seen in 2016. Gurugram, Rewari, Charkhi Dadri, Rohtak, Panipat, and Mahendragarh all reported sex ratios below 900, indicating ongoing gender imbalance. Virendra Yadav, chief medical officer of Gurugram district, attributes registration challenges to issues with the state's portal, which delayed entries. Yadav notes that this technical problem had impacted reported births. The "Beti Bachao, Beti Padhao" initiative, launched by Prime Minister Narendra Modi in 2015, initially raised the sex ratio at birth to 923 by 2019. However, the ratio has declined again since 2020. Officials in several districts of Haryana inform *Down To Earth* that while sex determination and female foeticide have nearly stopped in the state due to strict vigilance, people now travel to neighbouring states, including Delhi, Uttar Pradesh, Punjab, and Rajasthan, where the business of ultrasound operators and abortion centres is flourishing.

# What Trump's win means

Donald Trump's election as US' 47<sup>th</sup> president is the start of a new political era, and its impact would be felt across the world, across sectors



## 'A blow for climate justice'

DONALD TRUMP'S victory is a profound blow to global climate justice and an alarming escalation of climate risk for the world's most vulnerable communities, including those in India. Trump's push to ramp up fossil fuel production, disregard for international agreements, and refusal to provide climate finance will deepen the crisis, endangering lives and livelihoods—especially in regions least responsible for, yet most impacted by, climate change. With the 29<sup>th</sup> Conference of Parties (COP29) to the UN Framework Convention on Climate Change (UNFCCC) starting at Baku, Azerbaijan, during November 11-22, and aiming to secure an ambitious new climate finance goal, this news makes the already challenging path to consensus even steeper and more uncertain.

—**Harjeet Singh,**

Climate activist and Global Engagement Director for the Fossil Fuel Non-Proliferation Treaty Initiative

## 'Support may stall for climate action'

DURING HIS campaign, Donald Trump has repeatedly described climate change as "one of the greatest scams of all time" and called on Americans to "drill, baby, drill" for more oil and gas. He has spoken about his intentions to dismantle energy and environmental policies and pull the US out of the Paris climate accord, as he did in 2017. There is a possibility that he may unplug the US from the Paris Agreement once again. Climate aid from the US towards the developing world will certainly get scaled down under his leadership. Progress on reform of the international financial architecture (IFA) is likely to be harder to achieve without US cooperation. Trade wars may escalate. Trump has threatened to impose 60 per cent tariffs on Chinese goods, called India the "biggest" import tariff charger and has vowed to reciprocate once he comes to power.

—**Upamanyu Das,**

Programme officer, Centre for Science and Environment

## 'Reproductive justice trumped?'

THE REPRODUCTIVE rights of millions of American women hang precariously in balance. This election—the first since the landmark *Roe versus Wade* decision was overturned in 2022, effectively ending 50 years of federal protections for abortion access—was shaped by the aftereffects of that historic shift. During the campaign, Trump moderated his long-held position on abortion, suggesting that, if necessary, he might veto any outright abortion bans that come across his desk. However, he quickly backtracked on this upon receiving criticism from anti-abortion and conservative groups, on whose support he had previously won the presidential election in 2016. This softening may be a response to the rising demand for reproductive justice across the nation. However, there's uncertainty about whether campaign promises will translate into meaningful protections.

—**Poonam Muttreja,**

Executive director, Population Foundation of India

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**BITS GLOBAL**

**Concerns mount** after US' Department of Agriculture on October 31 reported that a pig on a backyard farm in Oregon was infected with bird flu, caused by the highly pathogenic avian influenza (HPAI) H5N1 virus clade 2.3.4.4b. The strain is spreading worldwide since 2020, affecting a broad range of species. Throughout this outbreak, spillovers to mammals like dairy cows and cats have been documented. However, its detection in a pig is concerning. Pigs are the ideal genetic mixing vessel to generate a human pandemic influenza strain, because they have receptors in their respiratory tracts which both avian and human flu viruses can bind to.

**The World** Health Organization (WHO) has activated the Global Health Emergency Corps for the first time in response to the recent mpox outbreak, signalling an urgent response effort to control the disease across multiple regions. Mpox is a viral infection that spreads through close contact. Symptoms typically appear within 21 days and include fever, headache, back pain, fatigue, swollen lymph nodes and a pox-like rash lasting two to three weeks.



**Acute food** insecurity is projected to worsen in 14 countries and two regional clusters, covering 22 countries and territories during the next six months, says a new UN report. The 22 countries and territories are Nigeria, Sudan, Yemen, Ethiopia, Myanmar, Syrian Arab Republic, South Sudan, Zimbabwe, Zambia, Malawi, Haiti, Somalia, Chad, Niger, Mozambique, Burkina Faso, Palestine (Gaza Strip), Kenya, Mali, Lebanon, Namibia and Lesotho.

**Saudi Arabia's** Al-Jawf region experienced heavy snowfall and rainfall reportedly for the first time in recorded history, with the desert landscape blanketed in a layer of white. Known for its wild flora, Al-Jawf expects an abundance of plants like lavender and chrysanthemum, because of this unusual moisture.

**BITS INDIA**

**India's hidden** costs of agrifood systems were \$1.3 trillion annually, largely driven by unhealthy dietary patterns and dietary risks associated with non-communicable diseases, found the State of Food and Agriculture 2024 report by Food and Agriculture Organization (FAO) of the UN. Dietary risks stemming from consumption of processed foods and additives and low consumption of plant whole foods and beneficial fatty acids form over 73 per cent of the hidden costs.

**A new** jumping spider species has been discovered from a hill in Pune, Maharashtra. Christened as *Okinawicius tekdi*, the species belongs to genus *Okinawicius* Prószyński, first described from India in 2016. Tekdi in Marathi translates to "hill" and the species was named as a tribute to its geographical origin.

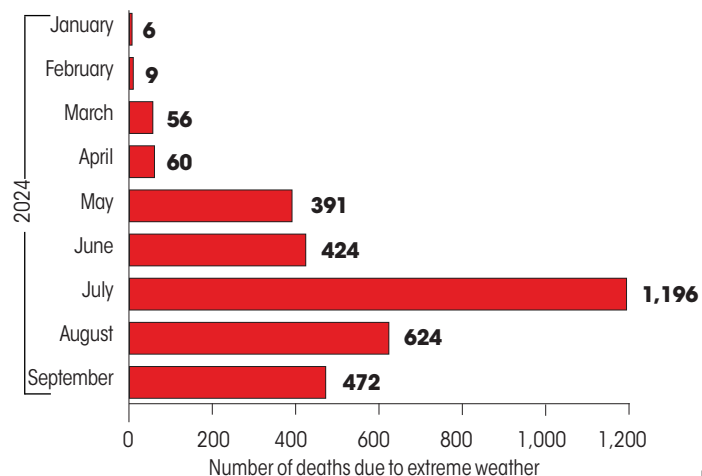


**The Centre** has doubled penalties on farmers burning crop stubble and has notified new rules under the Environment Protection Act (EPA), 1986, for filing complaints, holding an inquiry, and laying down the adjudication process for environmental pollution. Farmers with less than two acres (1 acre equals 0.4 ha) of landholding will now have to pay ₹5,000, those with two to five acres will pay ₹10,000, and those with over five acres ₹30,000 per incidence of burning paddy stubble.

**Indian farmers** were implicitly taxed US \$20 billion in 2023, the highest among 54 countries, due to export bans, duties or other policies which lower the price of agricultural commodities like rice, to benefit consumers, the latest assessment by Organisation for Economic Co-operation and Development (OECD) on agricultural policy and support globally reveals. In 2023, the Indian government introduced export restrictions on commodities like rice, de-oiled rice bran, sugar and onions to keep food prices low for consumers. While this kept domestic prices from rising for the consumers, it also meant that producers' (farmers) receipts were lower than they would have been had these policies not been in place.

**TRACKER**

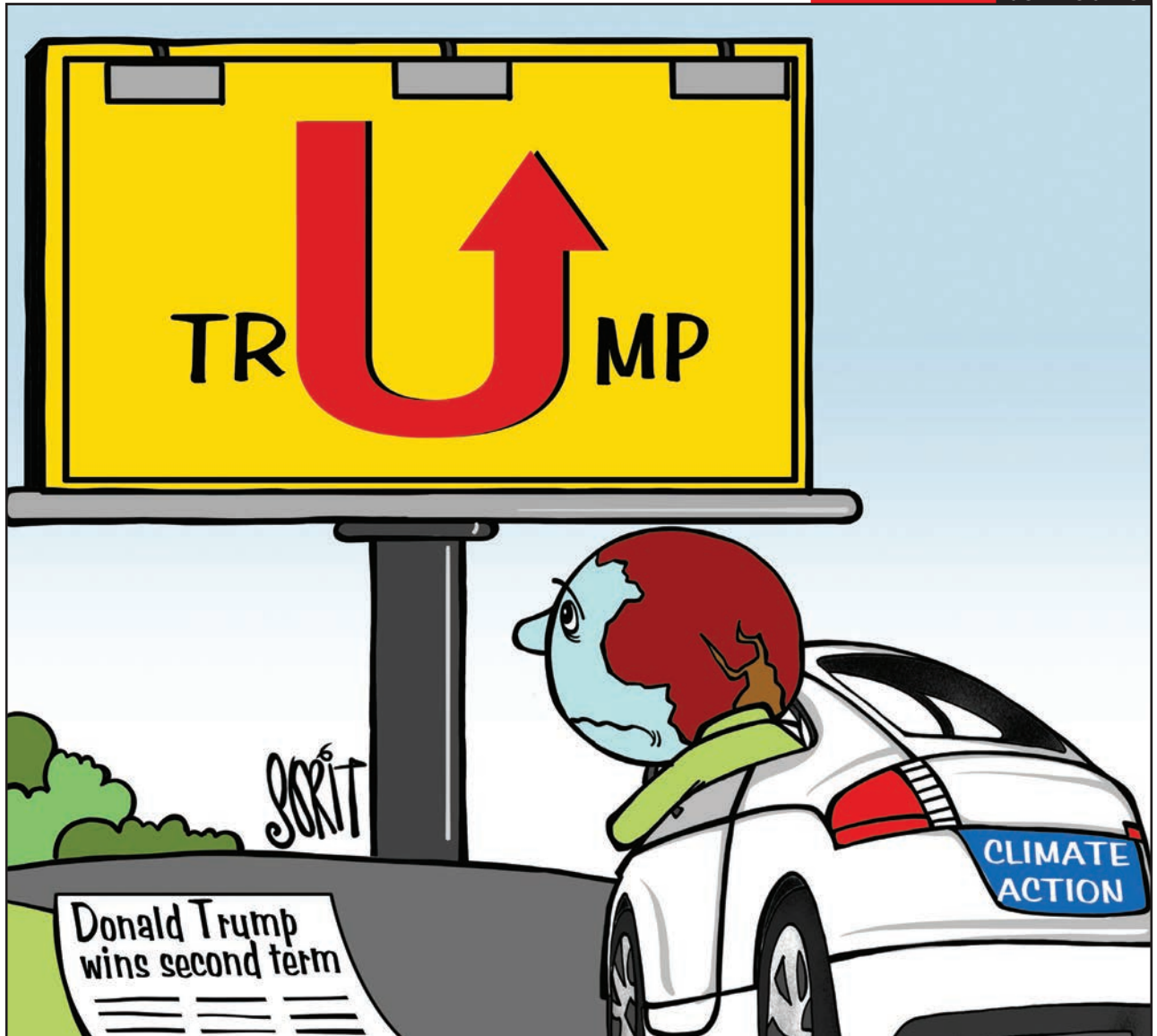
Extreme weather events claimed **3,238 lives** in the first nine months of 2024, marking an **18% increase from 2022**. Deaths were reported each month. While January recorded the fewest at 6, **July saw the highest toll** with 1,196 lives lost



Source: Extreme Weather Atlas, Down To Earth

FOR MORE INFORMATION SCAN





## BIG NUMBER

### US \$2 trillion

The estimated global economic losses between 2014 and 2023 because of extreme weather events. Climate change is a key driver of these events, which have increased by 83% between 1980-1999 and 2000-2019

Source: "The economic cost of extreme weather events", *International Chamber of Commerce*, November 7, 2024

## VERBATIM



**"CLIMATE CHANGE IS A HUMANITARIAN ISSUE. WE HAVE CALLED ON THE INTERNATIONAL COMMUNITY NOT TO LINK CLIMATE CHANGE MATTERS WITH POLITICS."**

#### ZAINULABEDIN ABID

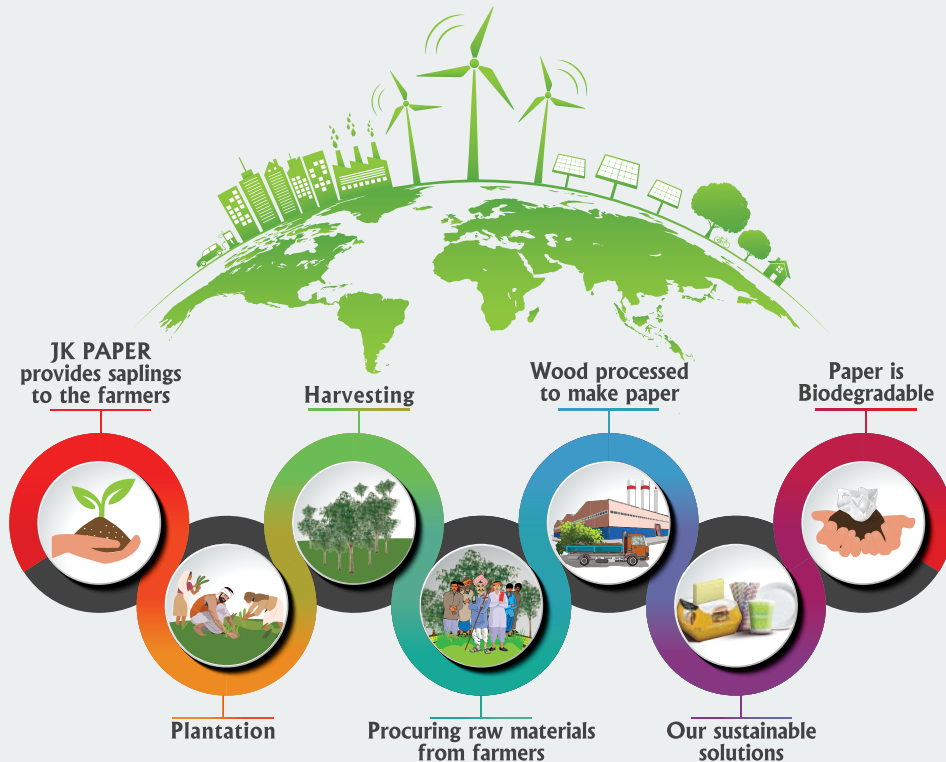
Deputy head of Afghanistan's National Environmental Protection Agency told news agency AFP while talking about the country's decision to send a delegation to the UN Climate Summit (COP29) in Baku, Azerbaijan—the first time since the Taliban assumed control in 2021.

By Akshit Sangomla, Shagun, Bhagirath, Jayanta Basu and Dakshiani Palicha





# JK PAPER'S COMMITMENT TO ENVIRONMENTAL STEWARDSHIP



## WE PLANT **220 SAPLINGS** EVERY MINUTE AND OVER **3,19,000 SAPLINGS** EVERY DAY FOR NURTURING THE ENVIRONMENT

For long, the paper industry has been tainted as one of the causes of deforestation, but we are here to change the narrative. At JK Paper, we are committed to care for the environment. We do not destroy natural forest trees to make our paper, instead leverage on Agro/Social Farm Forestry.

Our Agro/Social Farm Forestry, started in year 1991, relies on growing and harvesting unique varieties of trees (Subabul, Casuarina & Eucalyptus). Through our diligent R&D efforts, these special varieties of trees helped farmers get 2-3 times higher yields compared to traditional seed route plantations.

In FY 24, JK Paper distributed over 11.64 Crores saplings to farmers, which are harvested to produce paper. Since inception, JK paper has planted 9.50 lakhs acres of land under its Agro Social Farm Forestry Program. This program has not only positively impacted the environment, but also yielded livelihood opportunities for over 1,00,000 + lakhs farmer families. You can help us turn things around by choosing sustainable paper solutions and pave a path for a better tomorrow.

**We are a Carbon Positive Company**

# DISCREDITED AGAIN

A multi-million dollar fraud hits carbon offset industry, raising fundamental concerns about accounting practices of the transactions

**ROHINI KRISHNAMURTHY** NEW DELHI

**I**N WHAT appears to be the biggest case of fraud in the global carbon offset market so far, the US authorities have indicted former executives of one Washington-based C-Quest Capital over manipulating data from emissions-reduction projects to secure carbon credits worth tens of millions of dollars and an investment of US \$170 million.

For the uninitiated, carbon credits are issued against activities that either avoid greenhouse gas (GHG) emissions (such as by using an efficient cookstove or lighting system) or remove GHGs from the atmosphere (for instance, by planting trees). Each carbon credit represents 1 tonne of carbon dioxide or the equivalent GHGs (CO<sub>2</sub>e) avoided or removed, which is then bought by businesses that wish to offset their emissions or meet climate goals. While carbon credits are traded in compliance markets, so far established only by some national and regional governments, a global voluntary carbon market along with its supporting industry ecosystem has flourished in recent years in the absence of an internationally negotiated agreement to govern the space in accordance with the Paris climate treaty, in force since 2016.

C-Quest generated and traded

carbon credits in this voluntary carbon market (VCM) through projects like installing cookstoves in rural Africa and Southeast Asia, among other places. The company on its website claims that its cookstoves are “thermally efficient” and “clean”, which reduce people’s exposure to toxic smoke, while ensuring “climate change mitigation” through the avoidance of carbon emissions and other GHGs.

The indictment report of the US Attorney’s Office, however, alleges that former executives of the company obtained carbon credits by using “manipulated” and “misleading” data. “They then sold those credits to unsuspecting buyers in the multi-billion-dollar global market for carbon credits. The alleged actions of the defendants and their co-conspirators risked undermining the integrity of that market, which is an important part of the fight against climate change,” said US Attorney Damina William. Prosecutors have announced criminal charges against Kenneth Newcombe, founder and former chief executive officer of C-Quest, and Tridip Goswami, who headed its carbon

and sustainability accounting team. Jason Steele, C-Quest’s former chief operating officer was also accused of the fraud but has pleaded guilty. Goswami and Newcombe have denied any wrongdoing. “I haven’t received any notices. I was a mere employee and the decision-makers were different. I do not think there was any data manipulation,” Goswami tells *Down To Earth* (DTE).

“This case serves as a powerful reminder of how carbon credits po-







tentially represent nothing more than hot air,” Gregory Trencher, associate professor at Kyoto University in Japan, tells DTE. Trencher, whose research focuses on decarbonisation and energy policy, further says carbon market strongly contrasts with other commodity markets (which trade in raw or primary products) such as energy, minerals, and grains, where quality and quantity can be easily verified. Carbon credits, on the other hand, are intangible. Thus, the po-

tential for fraud, exaggeration, (accidental) inaccuracy and miscalculation is extremely high, he adds.

### FUDGE DATA, THEN TRADE

The potential for fraud is particularly high in VCM, which, according to a 2024 article in *Colorado Law Review*, is not only highly unregulated but is also plagued by conflicts of interest and lack of transparency. Main players in this market, states the article, are the project developers (entities that develop emissions-reduction projects like planting trees or distributing clean cookstoves), verification and validation bodies or VVBs (third-party entities that assess claims made by project developers) and standard setting bodies (groups of non-profits and business leaders that define project standards, certify offsets, and host registries that maintain information about credits issued, traded and retired or removed from circulation after a company uses it for offsetting emissions). Verra and Gold Standard are the two leading standard setters in VCM. “The problem lies in the fact that each of the players in this game—the project developer, the standard setter, and the VVB—has incentives to overstate offset claims,” states the *Colorado Law Review* article. For instance, standard setters’ fees depend on how many offsets they certify. VVBs that audit projects are hired and paid for by the project developers. And these conflicts of interest appear to have played a role in the case of C-Quest.

In 2020, Newcombe, who was on the Board of Directors of Verra, which certifies C-Quest’s projects, proposed that the standard setter adopt a new methodology for calculating emissions reductions from cookstove projects. As per the in-

dictment report, Newcombe was in favour of the new methodology “because he believed it would allow CQC [C-Quest] to generate more VCUS [credits].” It probably did. According to “Voluntary Carbon Market Developer Overview” for 2022-23 and 2023-24, in 2022, C-Quest ranked 11 among the top 25 developers operating in household devices and cookstoves space of VCM. A year later, it rose to the top, registering 354 per cent year-on-year growth in credits issued and 42 per cent growth in projects. The indictment report suggests that from about 2021, through 2023, the former executives used the new methodology to manipulate data related to emissions reduction and obtain credits.

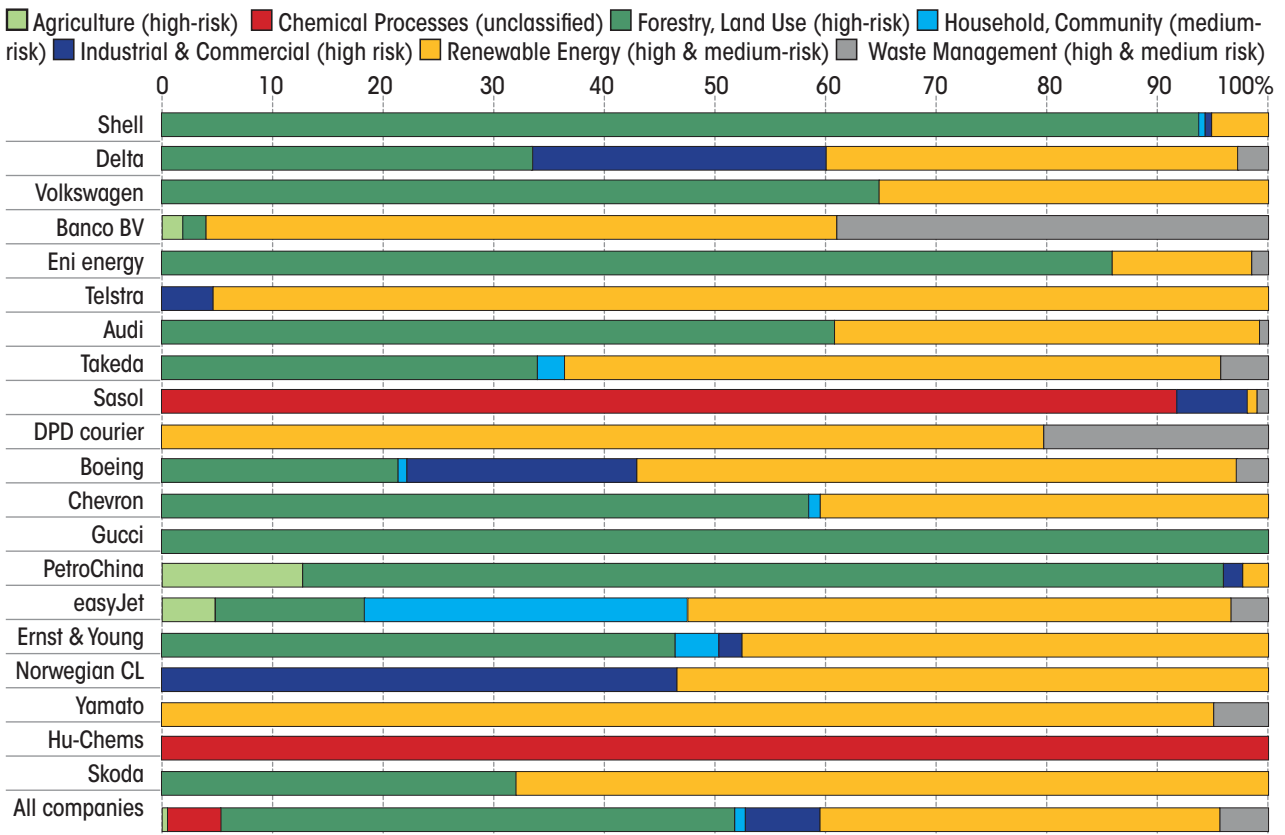
While the methodology involved several inputs, the number of carbon credits that the project developer would receive largely depended on two variables. One, the amount of fuel used on the new cookstove (known as “ByNew”), which is the methodology used to calculate the fuel saved per stove by comparing with the traditional one and then estimate the emissions avoided. Two, the percentage of stoves installed during the project that were still operational (“p” value), which the methodology used to determine the number of stoves for which emission reductions could be claimed. Under the methodology, both the values were to be determined through surveys, which allegedly allowed the former executives of C-Quest to fudge data.

Investigations by the US authorities showed that the original ByNew values for a project in Malawi, for instance, was 2.35 kg per stove per day. Since a higher ByNew value represents higher emission reduction and thus more carbon credits, the former execu-

## Unlikely to benefit climate

Demand is high for problematic and cheap offset types known to overstate emission reductions, shows analysis of 20 companies that retired most offsets from voluntary carbon market over 2020-2023

**Note: High risk, medium risk and low risk denote the quality of emissions reductions the project types provide; those with high offset risk have high overstated climate benefits**



Source: "Demand for low-quality offsets by major companies undermines climate integrity of the voluntary carbon market", *Nature Communications*, August 10, 2024

tives inflated the values to 3.66 kg per stove per day. Similarly, a loophole in the methodology allowed them to alter the p-value; surveyors could inflate the sample size in case they found missing or broken stoves in the original sample. "This practice was explicit in CQC's non-public training manual, which stated: 'Additional households should be surveyed to compensate or cover up for households where any one or both project stoves were not found operational'," says the indictment report.

During a parallel investigation, the US Securities and Exchange Commission found C-Quest manip-

ulated thermal efficiency of its cookstoves that failed to meet the minimum standard of 25 per cent.

Usually standard setting bodies depend on VVBs for cross-checking information provided by the project developer. Most of the projects that have come under scrutiny were audited by one VVB Carbon Check, based in Noida, India. Vikas Singh, executive director of Carbon Check, did not respond to DTE's email regarding the verification process,

The case came to light in 2023, after employees of C-Quest reported data discrepancies to the company's Board of Directors, which then initiated an investigation into

the projects and informed US regulatory authorities and Verra of its former executives' wrongdoings. In June, Verra put 27 projects, most of them in Africa, on hold and initiated a review. As of October 17, it has announced the results of 22 projects, which shows C-Quest was issued over 5 million excess credits. To compensate for these, Verra has "cancelled" 5,004,915 carbon credits of C-Quest. When DTE approached Verra to understand if the excess credits issued between 2021 and 2023 had been bought and then retired, it declined to comment, saying, "this is now subject of a criminal investigation".



**AAETI**

## RESIDENTIAL TRAINING ON LAND ACQUISITION, REHABILITATION AND RESETTLEMENT

**COURSE DATE:** February 11-14, 2025

**COURSE VENUE:** Anil Agarwal Environment Training Institute (AAETI), Neemli, Alwar, Rajasthan

As the country is progressing towards development, the arising need for more land is inevitable and so are the conflicts with the displacement of people. In order to minimize these conflicts, it is prudent to provide the inhabitants fair information on the impacts of the projects and the compensation against the acquisition of their lands. It is where Social Impact Assessment plays a crucial role.

Social Impact Assessment (SIA) is the process of analyzing, monitoring and managing the social and cultural consequences of projects. It is an important tool to inform decision makers, regulators and stakeholders about the possible social and economic impacts of a development project. In order to be effective, SIA requires active involvement of all concerned stakeholders. Further, an understanding of RFLARR Act, 2013 and its provisions in terms of rehabilitation and resettlement is crucial to provide necessary compensation to the affected people.

With an objective to enhance the capacity of the stakeholders in this domain, Centre for Science and Environment is conducting a four-day residential training programme which focusses on the complete process of SIA and R&R including baseline data collection, land acquisition survey, preparation of the resettlement action plan (RAP), Asset evaluation etc. The programme aims to build a cadre of trained professional who are well versed in SIA reporting and land acquisition matters. .

### WHO CAN ATTEND?

• SIA practitioners and consultants • Government officials from state revenue department, municipality, district collector, mining etc • Development corporations and industries • Academicians, students, researchers • Civil society groups, NGOs, advocates • Anyone else interested in the subject

### LEARNINGS FROM PROGRAMME:

The participants will develop a complete understanding of

- **SIA methodology:** Tools and instruments for conducting a SIA study
- **Baseline data information:** Learn data need, data collection, collation and interpretation
- **Act and Policies:** Learn provisions of the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act-2013, issues and challenges in land acquisition, and how to prepare land acquisition plan
- **Public consultation:** Learn identification of affected people, modes of engagement and stages at which it is required.
- **Rehabilitation and resettlement plan:** Learn how to do asset evaluation, prepare entitlement matrix and develop R&R plan.
- **Reporting methodologies:** Learn how to develop a SIA report

**COURSE FEES:** ₹ 28,000

(includes training fees, accommodation, food and travel from/to Delhi and training centre)

For relevant government officials, the course fee is sponsored by CSE.

**Note:** Participants have to reach CSE's Delhi office on February 10 latest by 1 pm. Transport to the campus will be arranged from the CSE's office.

**FOR ANY QUERIES, PLEASE CONTACT**

**Ishita Garg**, Training coordinator, Email: [ishita.garg@cseindia.org](mailto:ishita.garg@cseindia.org) | Mobile: +91-9899676011

## GAINS OVER-CREDITED

This is not the first time VCM has been the subject of controversy. In 2023, DTE in collaboration with the Centre for Science and Environment (CSE), Delhi, conducted an investigation into the workings of VCM in India (see 'Discredited', *Down To Earth*, October 1-15, 2023). The investigation revealed that a massive number of projects was being implemented under the household and community category, largely through the distribution of cookstoves and biogas. DTE-CSE visited two cookstove projects—one being implemented by Greenway Grameen Infra (registered with Gold Standard) and the other by EnKing International (now EKI Energy, registered with Verra). The team found glaring gaps in project design and implementation, which could have allowed the developers to mint more carbon credits than they deserved. For instance, both the projects estimated reduction in emissions, assuming that the target population was primarily dependent on non-renewable biomass and ignoring that many possessed LPG connections and also used it. Both the companies assumed a 100 per cent usage rate but on ground, DTE-CSE found irregular use of improved cookstoves.

Researchers attribute such over-crediting to poor methodologies used in VCM. Assessment by DTE shows that companies, such as EKI Energy followed the methodology of Verra—VMR0006, version 1.1—that allowed C-Quest to manipulate offset data. Could they have taken advantage of the loopholes to overestimate carbon credits? "Many methodologies being used in the VCM are more convenient for the compa-

nies than they are accurate in calculating emission reductions and credits," says Daniel M Kammen, professor of energy at the University of California, Berkeley, US. This is particularly true for cookstoves—one of the fastest growing project types. Kammen and two other researchers from the university have analysed credits obtained through five cookstove methodologies, and found that the project sample is over-credited 9.2 times. "Over-crediting is mostly from exaggerated estimates of stove adoption and use, underestimates of the continued use of the original stove and high estimates of the impact of fuel collection on forest biomass," the researchers

## OVER-CREDITING IS MOSTLY FROM EXAGGERATED ESTIMATES OF STOVE ADOPTION, USE; UNDERESTIMATES OF CONTINUED USE OF ORIGINAL STOVE; AND HIGH ESTIMATES OF THE IMPACT OF FUEL COLLECTION ON FOREST BIOMASS

state in the study, published in *Nature Sustainability* on January 23. For example, Verra's clean development mechanism-era methodology, AMS-II-G, which was used by Greenway Grameen at projects visited by DTE-CSE in 2023, requires surveyors to simply ask if households used the improved stove in the last week or month. If users replied "yes", credits would be issued assuming that they used the stove 100 per cent of the time for the entire monitoring period. Then, there is recall bias as households can struggle remembering stove use over the past year. The researchers find AMS-II-G—firewood to be the most over-credited project type, while Gold Standard's Metered methodology that tracks stoves and fuel through metres, was

the best performing one, overvaluing credits by 1.5.

Another variable that allows over-crediting is the fraction of non-renewable biomass (fNRB), which represent the proportion of wood harvested unsustainably, before it regrows in the area. A value of 0.3, for example, suggests that 30 per cent of the biomass is harvested faster than it regrows, while 70 per cent is harvested sustainably. This parameter, however, cannot be directly measured, and hence experts use modelling. The *Nature Sustainability* study notes that projects have opted to use older or default values to calculate fNRB instead of newer ones that have existed for eight years. This results in 2.3 times over-crediting.

A study led by Trencher and published in *Nature Communications* on August 10, analysed carbon offsets of 20 companies that retired most offsets from VCM over 2020 to 2023, and found that companies also prefer sourcing low-quality cheap offsets; 87 per cent carry a high risk of not providing real or additional emissions reductions. The findings provide evidence that the VCM is not supporting effective climate mitigation, says the study.

The C-Quest case shows that carbon credit claims are fast coming under scanner. "Over the past two years, US Commodity Futures Trading Commission (CFTC) has developed guidelines for VCM. This is their first enforcement action in VCM," says Axel Michaelowa, Switzerland-based senior founding partner of Perspectives, a think-tank, adding, "We should see whether this [case] would change the behaviour of what I would call the carbon cowboys." **DTE** @down2earthindia



# THE/NUDGE Prize



## Uniting the Ecosystem: Empowering Smallholder Farmers and Solving India's Water Crisis

Smallholder farmers are key to solving India's water crisis, accounting for 86% of farming households. Agricultural consumption accounts for 75-90% of India's freshwater use.

Despite appearing to be a large market for innovative private players, significant barriers exist. These include lopsided incentives due to subsidised and erratic power supply, unregulated groundwater use, and the cultivation of water-intensive crops in unsuitable regions.

This complex problem requires diverse solutions. The DCM Shriram AgWater Challenge has unearthed many, from automated irrigation to biologics and irrigation-as-a-service models. It also provides pathways to patient capital, helping startups acquire customers and build sustainable models.

However, the smallholder farmer market's fragmentation extends beyond size, region, and crop types. It's also cultural. Many farmers view their land as integral to their heritage and livelihood, making them hesitant to adopt collective farming practices or new technologies without immediate benefits.

Market players often misunderstand this, expecting resource-strapped farmers to adopt cost-effective solutions readily. For smallholder farmers, numerous other variables influence decisions. Many consider farming their secondary profession and would rather invest in their primary occupation than in improving an unviable trade. They're suspicious of new players offering to solve old problems and prefer to wait and watch.

### The Role of Civil Society and Research Institutes

Research institutions also play a vital role. Focused research in areas like material sciences and sensor technology can support the development of more efficient and applicable agricultural technologies. For instance, sensor efficiency advancements can improve water management, while material sciences can

develop more durable, cost-effective farming tools. Collaboration between technology companies and research institutions ensures innovations are both practical and effective, tailored to smallholder farmers' specific needs.

*Civil society organisations are crucial in bridging the trust deficit between technology providers and local farmers. With deep-rooted community connections, they can facilitate the introduction of new technologies, build trust, and provide support and training. Farmers are more likely to adopt new practices when introduced by trusted entities rather than unknown technology providers.*

### Technology Providers and Patient Capital

While technology providers are at the forefront of developing innovative solutions, their success depends on support from the broader ecosystem. These providers need patient capital, allowing them to refine their technologies and demonstrate effectiveness over time. This long-term investment approach is crucial for acquiring a minimum threshold of customers to create momentum. Additionally, technology providers require a network of partners, including civil society organisations and research institutions, to facilitate technology adoption and establish evidence of change.

### The Path Forward: Collaboration and Innovation

To address the water crisis and support smallholder farmers effectively, creating a collaborative ecosystem where all stakeholders work together is essential. The DCM Shriram AgWater Challenge— an initiative by DCM Shriram Foundation & The/Nudge Prize, has served as a melting pot for different interventions, bringing together various players to address this multifaceted issue. By fostering collaboration among technology providers, civil society organisations, research institutions, and investors, the challenge has created a blueprint for tackling complex agricultural problems.

The knowledge generated by the challenge is invaluable for anyone looking to contribute to

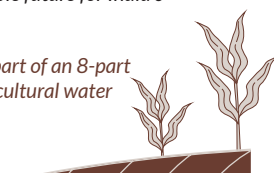
this cause. It offers insights into the practicalities of implementing technological solutions in diverse and fragmented agricultural landscapes. For policymakers, this means drafting supportive policies that encourage efficient technology adoption. For investors, it means understanding the need for patient capital and the long-term nature of agricultural innovation. For civil society organisations and researchers, it highlights the importance of trust and practical research in driving adoption.

Solving India's water crisis requires a collective effort. The DCM Shriram AgWater Challenge has demonstrated the power of collaboration and the potential of a supportive ecosystem. As we move forward, it's crucial that all stakeholders work together, leveraging their unique strengths.

Governments can provide policy support to scale proven solutions, while patient capital from investors can help promising startups acquire a critical mass of customers. Research aid can establish evidence of change, further encouraging adoption and policy support. This ecosystem approach ensures that innovative solutions have the best chance of success and widespread implementation.

*If you're part of this ecosystem—whether in government, civil society, investment, or research—there are several ways to contribute. Engage with organisations and initiatives mentioned, such as The/Nudge Prize, DCM Shriram Foundation and this AgWater Challenge. Explore opportunities to collaborate, provide funding, or offer your expertise. Together, we can create an environment where innovative solutions thrive and farmers benefit, ultimately securing a sustainable future for India's agriculture.*

*"This article is one part of an 8-part series covering agricultural water utilisation in India."*





# Short on gadgets

The precision of cyclone forecasts in India is hampered by limited and outdated monitoring instruments

**AKSHIT SANGOMLA** NEW DELHI

**C**YCLONE DANA, which struck Odisha and West Bengal in October 2024, highlighted the limitations of current weather monitoring and forecasting systems in India. Just hours before landfall, two major international forecasting systems—the US Global Forecasting System (GFS) and the European Centre for Medium-Range Weather Forecasts' Integrated Forecasting System (IFS)—provided conflicting forecasts. GFS predicted landfall near the Odisha-West Bengal border, while IFS placed it closer to Paradip in Odisha. However, the cyclone made landfall near Bhitarkanika National Park in Odisha, almost 100 km from Paradip Port.

Unlike global forecasting systems, the India Meteorological Department (IMD) provided more accurate landfall predictions, utilising doppler weather radars (that track the movement and speed of a cyclone using microwave signals) at Odisha's Paradip and Gopalpur ports, along with satellite data. The department, however, fell short at forecasting the resultant rainfall. It had predicted more rainfall for Odisha than for

PHOTOGRAPH: REUTERS





neighbouring West Bengal, but the opposite happened. On October 25, the day of the cyclone's landfall, only three districts of Odisha received over 40 mm of absolute rainfall. Kendrapara recorded the highest rainfall of 85.9 mm, which is 899 per cent more than the normal for the particular date. In West Bengal, six districts received more than 40 mm of absolute rainfall with West Midnapore district recording the highest rainfall of 71.1 mm which was 2,534 per cent more than the normal. On October 26, five districts of Odisha and 13 districts in West Bengal received rainfall of 50 mm or more.

This occurred because just before and after making the

landfall, cyclone Dana was stuck between two anti-cyclones or high pressure areas at a height of 5-6 km above sea level in which the rotation of air is in the clockwise direction, opposite to the air circulation in a cyclone. "One of these was west of the landfall and the other was towards the east of the landfall. The anti-cyclone on the west was feeding dry air to the cyclone which led to its rapid dissipation once it crossed over to land and did not let it move further inland. The cyclone was still getting moisture from the Bay of Bengal towards the east which led to the unexpected heavy rainfall in West Bengal," says K J Ramesh, climate scientist and former director-general of IMD. The weather models of IMD were showing the development of at least one of these anti-cyclones but the timing was not clear therefore it would not have been included in the rainfall forecast, he adds. "The mapping of mid troposphere moisture in and around a cyclone is crucial to know where and how much it would rain," says Roxy Mathew Koll, climate scientist at the Indian Institute of Tropical Meteorology, Pune. "The observations, modelling and forecasting of moisture in general and specifically for cyclones has failed miserably till now," he adds.

The other important aspects that are missing from observations of cyclone characteristics hence from modelling and forecasting are data from the ocean surface, specifically of sea surface and subsurface temperatures and wind speed data from ground based high wind speed recorders. "Across the world's ocean basins the measurement of subsurface temperatures is not done very well right now and this is one of the gaps in data for tropical cyclones that we have," says Koll.

While satellites are good at monitoring of sea surface temperatures, subsurface temperature data needs to come from surface monitoring using instruments such as buoys (floating objects anchored in a waterbodies to collect data on sea surface and subsurface temperatures, currents and winds) or ARGO-floats (robotic floats that drift below the ocean surface to collect information such as temperature, salinity and others).

Ocean heat data from these monitoring instruments is used to calculate the tropical cyclone heat potential, which measures ocean heat from the surface down to 700-1,000 metres. This measurement is crucial for predicting a tropical cyclone's likelihood of rapid intensification (RI), where wind speeds increase by more than 55 km/h in 24 hours, according to Ramesh. RI has made recent cyclones in the North Indian Ocean region (which includes the Bay of Bengal and the Arabian Sea) increasingly unpredictable.

### Limited capacity

While the science is clear, experts admit that the country's coast does not have enough density of instruments to correctly track all cyclones. Further, many of the existing instruments are either outdated or non-functional. There are two networks of buoys in the North Indian Ocean. The first is the Ocean Moored Buoy Network for Northern Indian Ocean (OMNI), which is maintained by the National Institute of Ocean Technology (NIOT), Chennai, and the collected data is managed by the Indian National Centre for Ocean Information Services (INCOIS), Hyderabad. The network has 12 buoys only 9 of which are currently in the North Indian Ocean region



Although cyclone Dana made landfall in Odisha, it caused heavy rainfall in West Bengal because of being trapped between two anticyclones. Forecasters were unable to predict this rare phenomenon, which altered the cyclone's path, largely due to the insufficient monitoring instruments along and around India's coast

## Tools to predict a cyclone

Forecasting precision depends on the amount of data shared by a network of instruments

### HIGH-SPEED

#### WIND RECORDER

captures wind speeds close to the ground which is also crucial for forecasting

#### CURRENT STATUS

India has around 35 along coasts, but ideally needs at least one in each coastal taluka

### SATELLITE

collects data on sea surface temperatures, wind speeds and cloud characteristics from space.

#### CURRENT STATUS

India has three satellites collecting data which is enough for the job

### BUOYS

collects data on sea surface and subsurface temperatures, sea currents, winds, humidity, air pressure, air temperature, rainfall and solar radiation

#### CURRENT STATUS

Indian buoy network needs to be expanded and upgraded urgently

### DOPPLER

#### WEATHER RADAR

collects data on winds speeds slightly above the surface of land or sea and moisture levels to determine cyclone structure, path and intensity

#### CURRENT STATUS

India has 15 doppler weather radars along the coast but many need to be upgraded and new ones are required, especially in the Andaman and Nicobar and Lakshadweep Islands

Source: Based on interactions with climate scientists

and only eight are reporting data, according to the INCOIS website. "Around 50 per cent of the buoys in the Bay of Bengal are functional. Two of these fell in the path of the cyclone Dana. They helped us predict the landfall precisely," says Ajay Kumar B, scientist with INCOIS. "India lost a lot of its own buoys during the COVID-19 pandemic as they could not be maintained and repaired," says Koll.

The second network is the Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction (RAMA). It is a collaboration between the US National Oceanic and Atmospheric Administration (NOAA) and INCOIS. At present, there are 25 RAMA buoys in the region, out of which only 11 are reporting data. The North

Indian Ocean also has around 500 to 700 ARGO floats.

"NOAA has updated most of their buoys in the Arabian Sea and the west Indian Ocean regions but not in the Bay of Bengal," says Koll. The replacement of the Indian buoys has been slow because of the push by the Indian government for manufacturing them in India instead of getting them from other countries, he adds.

Most of the instruments transmit their data to a satellite which then relays the information to the base monitoring station. For instance, the ARGO floats remain under the ocean for 10 days before coming to the surface to transmit the data. "If outdated technology is used there is a higher chance of the data redundancy and transmission

delays these instruments not reaching on time," says Ramesh.

Another important instrument in cyclone forecasting is high-speed wind recorders. "Doppler weather radars measure wind speeds slightly above surface level; however, for accurate cyclone predictions, continuous data on surface-level wind speeds is also critical, which is captured by high-speed wind recorders," says Ramesh. Currently, the density of these recorders is low, with approximately 25 along India's east coast and 10 on the west coast. Ideally, there should be at least one IoT (internet of things)-based recorder in every coastal taluka to accurately measure wind speeds and improve tropical cyclone forecasts. **DTI**

⊗ @down2earthindia





## RESIDENTIAL WORKSHOP

# Decentralised Renewable Energy-based Solutions for Equitable Development

DATES: **DECEMBER 11-13, 2024**

LAST DATE TO APPLY: **NOVEMBER 22, 2024**

VENUE: **ANIL AGARWAL ENVIRONMENT TRAINING INSTITUTE (AAETI), NIMLI, RAJASTHAN**

### WITH EXPOSURE VISIT

**Despite** clear progress in its efforts to enhance energy access, India continues to witness significant gaps in the reliability and quality of power – even as energy consumption is all set to rise with a growing rural population. The intrinsic link between energy consumption, employment and livelihoods underscores the importance of integrating decentralised renewable energy (DRE) into the country's framework for employment and sustainability. By connecting DRE with livelihoods, investments in energy can translate into higher incomes and opportunities, thereby improving sustenance for rural and peri-urban communities. This approach not only enhances resilience and social security, but can also contribute to achieving multiple Sustainable Development Goals (SDGs).

Centre for Science and Environment (CSE) is offering a three-day residential workshop on DRE systems. The workshop will focus on the transformational role of DRE technologies in weak grid areas, examine the financing and policy landscape of the sector, and discuss how DRE can drive skills development and employment in rural regions.

- The course fee is inclusive of travel from Delhi to the training institute, accommodation, food, site visit, and all other workshop expenses.
- Confirmed attendees should arrange their travel in a manner so that they arrive in Delhi by 11 AM on December 10. Departure from Delhi can be scheduled for December 13 after 7 PM. CSE buses will ferry them from and to Delhi.
- Registration fee can be waived for government officials, NGOs, CSOs, village communities, panchayat officials and FPO representatives etc\*

## SEE THE WORKSHOP AGENDA HERE

### THE WORKSHOP IS OPEN TO

- Entrepreneurs and start-ups
- Village communities and panchayat officials
- State nodal agencies
- Local NGOs working in the DRE and livelihood sectors
- Employment and business aspirants in the RE sector
- Industry professionals and service providers

### COURSE FEE

Indian participants

**RS 21,000  
PER HEAD**

Foreign participants

**US \$300  
PER HEAD**

### KEY THEMES

- Policy landscape of the DRE sector -- current regulatory frameworks and policy challenges for DRE implementation
- Potential of DRE technologies to create jobs and build skills in rural communities
- DRE-livelihood technologies -- application of solar-powered devices for enhancing rural productivity and livelihoods
- Transformational role of DRE appliances in weak-grid areas -- how can DRE bridge the energy access gap in remote locations
- Financing landscape of the DRE sector -- exploring investment trends and financial solutions for scaling DRE projects

\*Cost of travel to Delhi from home destinations and back is to be borne by the participant/trainee or by the nominating authority.

**PARTICIPANTS WHO COMPLETE THE WORKSHOP WILL BE AWARDED A 'CERTIFICATE OF COMPLETION' BY CSE.**

### FOR FURTHER DETAILS, PLEASE CONTACT

**Binit Das**, Programme Manager, Renewable Energy Unit, CSE | Mobile: +91 80933 26269 | Email: [binit.das@cseindia.org](mailto:binit.das@cseindia.org)

Note: Registration is not a guarantee of acceptance of admission in the programme. Please apply early as the number of seats available is limited.

# ALMOST OUT OF REACH

Nations must collectively commit to cut 42% of annual emissions by 2030 and 57% by 2035 in the next round of nationally determined contributions in February 2025—and back this up with action. Else, the Paris Agreement's 1.5°C goal will be gone within a few years, warns a UN report

**ROHINI KRISHNAMURTHY**  
NEW DELHI

World must reduce annual GHG emissions by 42% by 2030 to limit global warming to 1.5°C

World must reduce annual GHG emissions by 28% by 2030 to limit global warming to below 2°C

If the world meets its current conditional NDCs, annual GHG emissions will fall by just 10% by 2030, leading to a temperature rise of 2.6°C by the end of the century

If the world meets its current unconditional NDCs, annual GHG emissions will fall by just 4% by 2030, leading to a temperature rise of 2.8°C by the end of the century

If countries continue with their current policies, global temperature will rise to 3.1°C



**T**HE WORLD has let another year slip by with negligible climate action, putting the planet on track for a temperature rise of 2.6-3.1°C by the century's end unless governments intervene urgently. At the same time, the global greenhouse gas (GHG) emissions in 2023 rose by 1.3 per cent compared to 2022, warns the UN Environment Programme's (UNEP) Emissions Gap Report 2024, an annual report that tracks climate action.

"We are increasing emissions instead of cutting them. We are going in the wrong direction. If we follow the current trajectory year-on-year, it will become impossible to keep 1.5°C alive. The report says it is technically possible to change course, and that we need 7.5 per cent emissions cuts annually until 2035 to stay on track to limit warming to 1.5°C," says Minal Pathak, associate professor at the Global Centre for Environment and Energy, Ahmedabad University, and one of the authors of the UNEP report.

The UNEP report tracks the "emissions gap,"

**A FAILURE TO INCREASE AMBITION IN NEW NATIONALLY DETERMINED CONTRIBUTIONS AND START DELIVERING IMMEDIATELY WOULD PUT THE WORLD ON COURSE FOR A TEMPERATURE INCREASE OF 2.6-3.1°C OVER THE COURSE OF THIS CENTURY**

which is the difference between global emissions based on current country commitments and the pathways needed to limit warming to well below 2°C and to pursue 1.5°C, as per the targets of the 2016 Paris Agreement. To achieve these goals, countries submit pledges or Nationally Determined Contributions (NDCs) detailing their plans to reduce greenhouse gas emissions and adapt to climate change impacts. These NDCs are updated every five years. The gap in implementing policies to achieve the NDCs for 2030 remains unchanged from last year's assessment, the UN report emphasises. The world has already warmed by about 1.3°C, bringing us closer to the critical 1.5°C threshold, which experts worry could be breached in less than a decade. A November 7 analysis by Copernicus, the EU's Earth observation programme, says that "2024 virtually certain to be the warmest year and first year above 1.5°C".

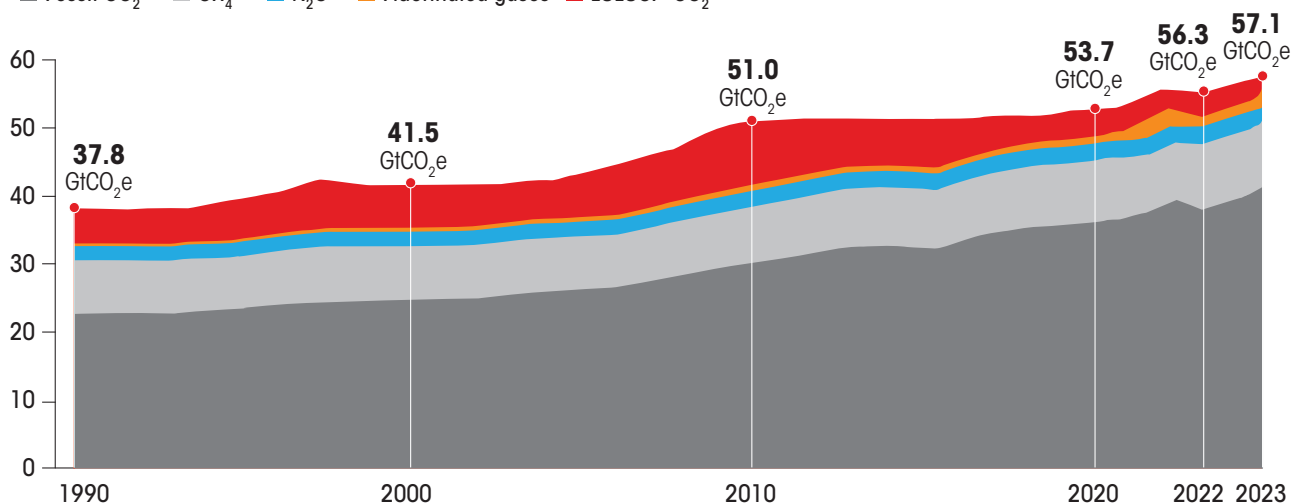
The emissions gap for achieving the 2°C target stands at 16 gigatonnes of carbon dioxide

## ON THE RISE

The world's greenhouse gas emissions increased by 1.3% in the past year alone, marking a rise of over 50% in the past 33 years

### Total net anthropogenic GHG emissions, 1990-2023

■ Fossil CO<sub>2</sub> ■ CH<sub>4</sub> ■ N<sub>2</sub>O ■ Fluorinated gases ■ LULUCF\* CO<sub>2</sub>



Note: \*Land Use, Land-Use Change, and Forestry | Source: UN Emissions Gap Report 2024

equivalent (GtCO<sub>2</sub>e) for 2030 and 21 GtCO<sub>2</sub>e for 2035 under current policies, the same as last year’s figures. For the 1.5°C target, the gaps for 2030 and 2035 are 24 GtCO<sub>2</sub>e and 32 GtCO<sub>2</sub>e, respectively, almost unchanged since last year’s assessment.

For conditional (requiring external financial support) and unconditional (restricted to domestic funds and as a result less ambitious) NDCs, the gaps for achieving the 1.5°C target are 19 GtCO<sub>2</sub>e and 22 GtCO<sub>2</sub>e by 2030, and 26 GtCO<sub>2</sub>e and 29 GtCO<sub>2</sub>e by 2035, mirroring last year’s values. Even if all nations fully implement their conditional and unconditional NDCs, emissions are projected to fall by only 4 per cent and 10 per cent by 2030 compared to 2019 levels, respectively. This falls significantly short of the Paris Agreement’s targets of reducing emissions by 28 per cent and 42 per cent by 2030 to meet the 2°C and 1.5°C goals, respectively.

Despite these targets, global GHG emissions continued to rise, and reached at an all time level of 57.1 GtCO<sub>2</sub>e in 2023, with the power sector as the largest contributor, followed by transport, agriculture and industry. Renewable energy also saw growth, with capacity additions rising by 50 per cent in 2023.

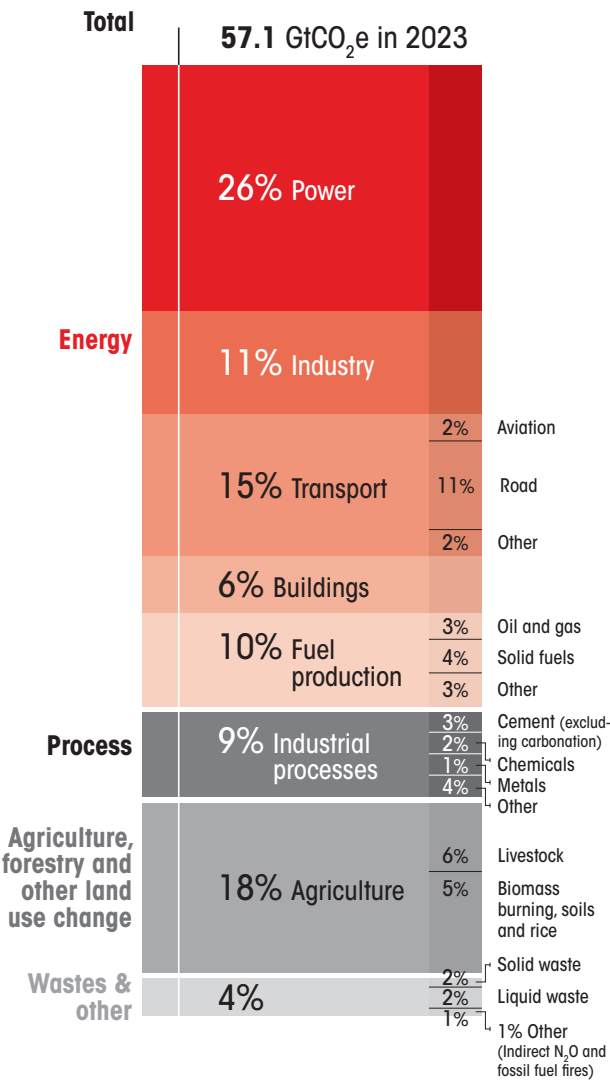
“The world is scaling up renewable energy and other low-carbon technologies, but we are not phasing out polluting activities fast enough. As a result, the stock of greenhouse gas emissions continues to grow, wreaking havoc on the planet,” says Avantika Goswami, climate change programme manager at Delhi-based non-profit Centre for Science and Environment. She adds that the indiscriminate and persistent consumption of fossil fuels by wealthy countries, despite big talk at global fora, has depleted the carbon budget—the cumulative allowable CO<sub>2</sub> emissions to remain within a given temperature threshold—that would have allowed developing countries to moderately raise emissions in their pursuit of prosperity.

TECHNICALLY POSSIBLE STILL

While countries are far from being on track to meet Paris Agreement goals today, the report notes that the 1.5°C target is technically achievable and also identifies a range of solutions across sectors. “This, however, depends on what countries do in the coming years, which nations can peak emissions, and what happens to different sectors.

PROBLEM AREAS

Energy sector was the largest driver of greenhouse gas emissions globally in 2023, responsible for 68% of the total



Source: UN Emissions Gap Report 2024

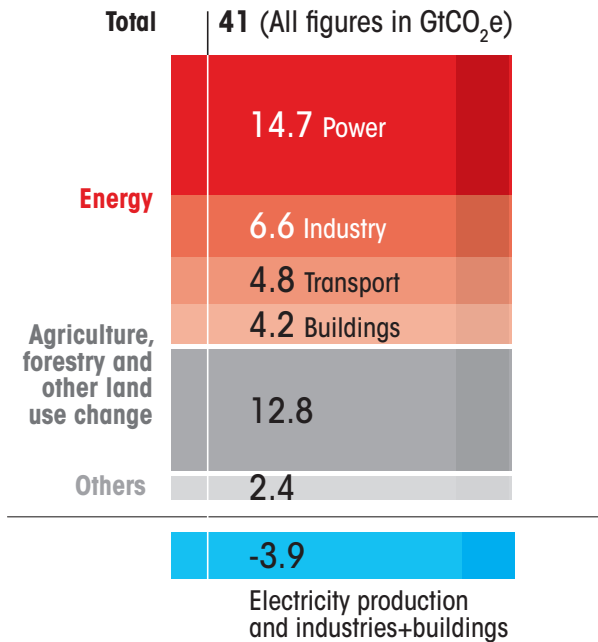
Besides, we cannot account for unpredictable events like wars and conflicts, countries’ economies and how the land use system will operate, all of which add to the uncertainty,” says Pathak.

The report, for instance, recommends that nations need to cut emissions by 42 per cent by 2030 and 57 per cent by 2035, relative to 2019 levels to follow the least-cost pathway for 1.5°C. For the 2°C target, reductions of 28 per cent by



## POTENTIAL SOLUTIONS

The global potential to reduce sectoral emissions is estimated at 31 GtCO<sub>2</sub>e / year in 2030 and 41 GtCO<sub>2</sub>e / year in 2035



Source: UN Emissions Gap Report 2024

2030 and 37 per cent by 2035 are needed.

Increased deployment of solar photovoltaic and wind energy could contribute 27 per cent of the total emissions reduction potential by 2030 and 38 per cent by 2035. Other measures, such as reducing deforestation, reforestation and improved forest management, could provide around 20 per cent of the potential in both years, the report says.

Among the sectors, agriculture, forestry and other land use change and industry need a considerable increase in investment to stay in line with the 1.5°C trajectory, with the two sectors requiring 171-198 times and 109-145 times jump in investments by 2035. The UNEP estimates that the cost of closing the emissions gaps for 2030 and 2035 is approximately US \$200 per tonne of CO<sub>2</sub>e. Investment in mitigation needs to increase sixfold, along with global financial system reform and strong private sector action. The global financial system, which refers to the infrastructure supporting international monetary interactions, is

critical to enabling these changes. To achieve Net Zero, incremental investments from 2021 to 2050 are estimated to range between \$0.9 trillion and \$2.1 trillion annually, representing 0.81–1.9 per cent of the global economy, valued at \$110 trillion per year.

## WORLD'S LAST REAL CHANCE?

In the 15<sup>th</sup> annual report, UNEP calls for “no more hot air” as countries approach the February 2025 deadline to submit their next NDCs till 2035. The world is also set to meet on November 11-22 for the 29<sup>th</sup> Conference of Parties (COP29) to the UN Framework Convention on Climate Change, the 2024 climate summit to be held in November in Baku, Azerbaijan. The climate event may well be the last of the opportunities for nations to discuss and present plans that, at least on paper, offer a fighting chance to limit global warming to 1.5°C.

The upcoming NDCs should address non-CO<sub>2</sub> gases like methane, nitrous oxide, and F-gases (hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride). Emissions of these gases rose in 2023, with F-gases growing fastest at 4.2 per cent, followed by methane at 1.3 per cent and nitrous oxide at 1.1 per cent. The report notes that anthropogenic methane emissions, the second-largest source of GHG emissions, largely stem from livestock, rice cultivation, oil and gas operations, coal mines and waste management. Many major economies are yet to include non-CO<sub>2</sub> gases in their NDCs or long-term targets, according to a 2022 paper in *One Earth*. The report also recommends that emerging markets and developing economies outline the international support and finance needed to meet ambitious NDC targets for 2035.

“While India is likely to meet its current NDCs, the government should make more ambitious pledges,” says Pathak. “If we set less ambitious targets, we will most likely achieve them. But as one of the largest emitters and among the lowest per capita, India should use this opportunity to take leadership in climate action and come up with sectoral targets in its next NDCs,” she adds.

Pathak believes India should identify the means of implementation and determine the investments needed—both for achieving deep emissions cuts and also financing adaptation—which is now increasingly becoming urgent. **DTE**

✉ @down2earthindia

# 'Rationing can be an effective emissions-reduction strategy'

The UN Emissions Gap Report outlines strategies to curb greenhouse gas emissions in sectors like energy and agriculture by 2030 and 2035. Yet, a backup may be needed if emissions persist, says Oskar Lindgren of Uppsala University, Sweden. He advocates rationing—a policy that helped the UK reduce consumption and income disparities post-World War II—as a possible climate tool. Rationing could offer equitable access by limiting emissions-intensive goods like fuel. In his September 2024 paper published in *Humanities and Social Sciences Communications*, Lindgren evaluates public acceptance of food and fuel rationing in select developed and developing nations. He found that acceptance levels are lower in developed countries.

**ROHINI KRISHNAMURTHY** spoke with **LINDGREN** about rationing's potential, challenges and its role if climate impacts escalate.

## Could rationing actually play a role in mitigating climate change?

Rationing could be one solution. My study aimed to assess whether rationing could be an option for countries, considering stricter climate policies, and whether it might gain public acceptance. Most climate policy research has overwhelmingly focused on price-based solutions like emissions trading systems—mechanisms that cap emissions and allow entities to trade allowances—and carbon taxes.

However, opinion surveys and other studies indicate that people often view these price-based instruments as unfair, as they raise prices and disproportionately affect lower-income groups. We wanted to see if rationing could offer a more equitable alternative to taxes on certain goods.

Research on rationing as a climate policy is limited. But an earlier study examined whether rationing, taxation or other policies could better achieve climate targets. It found that rationing might be a more effective emissions-reduction strategy than price-based approaches.

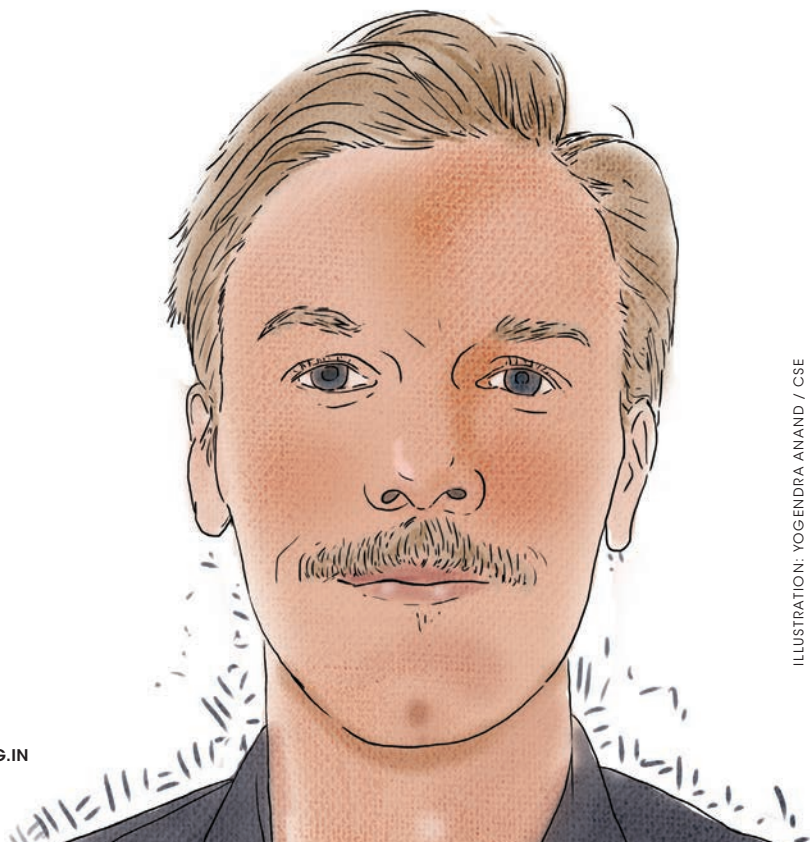


ILLUSTRATION: YOGENDRA ANAND / CSE



## **Rationing was used during World War II. How might it fit into the climate crisis?**

After the war, Europe and the US debated ways to cut household consumption, discussing both taxes and rationing. Most countries opted for rationing, as it effectively curbed consumption to a certain level. Climate change differs significantly from wartime challenges, as it is a long-term issue. Rationing improved life expectancy after the war and helped reduce income disparities in countries like the UK and Sweden. Climate policy discussions today also emphasise addressing social and income inequalities. While I am not advocating for immediate implementation, rationing could help tackle the dual challenges of reducing emissions and promoting equitable resource distribution.

## **Where do you think rationing holds more value in terms of outcomes?**

We found notable differences across countries. In high-income nations like the US, there was general reluctance towards policies like rationing and taxes. In South Africa, India and Brazil, however, acceptance was much higher for both types of instruments. This variation is interesting, as cross-country comparisons in this context are rare. These countries face different challenges with varying emission rates.

Rationing might be a viable option for countries without well-established tax regimes. Countries like Sweden or Germany, known for robust tax systems, have developed efficient mechanisms for tax collection and utilisation, so rationing might be less feasible due to the additional administrative effort required.

But for countries without carbon taxes, rationing could be more publicly acceptable.

In Europe and the US, there is a backlash against green policies. For instance, Sweden's current government, supported by a right-wing party and impacted by fuel price hikes due to the Russia-Ukraine conflict, has rolled back many green policies. In such high-income nations, rationing might be challenging politically, though it may gain traction if the climate crisis intensifies and cultural attitudes shift. This is a major problem. If we were to implement rationing in any context, we should probably do it in high-income countries because our consumption is unsustainable. For something like rationing to be implemented in developed

conservative and progressive leanings. We are also conducting a follow-up study in India to identify individual factors affecting rationing acceptance.

## **Is it possible for rationing and taxation to coexist in one country?**

We have considered this, but it is unclear why both would be necessary, as each aims to achieve similar goals. Implementing both would require administrative effort and infrastructure, so they are more likely to function as alternative approaches.

## **In the 2000s, the UK studied rationing and found it potentially expensive. Could you elaborate?**

Rationing could indeed be costly.

## **RATIONING SHOULD BE IMPLEMENTED IN HIGH-INCOME COUNTRIES DUE TO UNSUSTAINABLE CONSUMPTION, BUT OUR STUDY FOUND WIDESPREAD RELUCTANCE TOWARDS IT IN THESE COUNTRIES. THIS IS A MAJOR PROBLEM**

nations, there has to be a huge shift in culture. At this point, rationing would probably be unfeasible in many Western countries, but at some point, it might become an option.

## **Being a developing nation, Brazil is not as accepting of rationing as India and South Africa. Why is it so?**

We do not fully know yet, but there are some ideas. Brazil is a major meat producer and consumer, which could explain the lower acceptance of rationing compared to India or South Africa. We are currently studying factors that might influence acceptance, such as political trust and ideology, to see how responses vary between

The UK government analysed the costs and benefits of rationing and found it more expensive than carbon pricing. However, they considered rationing all emission sources—from food consumption to travel. Targeting only carbon-intensive goods could lower costs.

Yet, cost assessments do not always consider outcomes. Rationing might reduce income inequality, which could justify its cost. Politicians in European countries focus on upfront costs without weighing benefits. Today, rationing could be digital, possibly reducing costs compared to wartime efforts. A thorough cost-benefit analysis is essential if rationing is to be considered. **DTI**

✉ @down2earthindia

# TOWARDS A FAIR SHARE

In a historic move, the world has decided to include indigenous voices in the conservation of biodiversity. Some 190 nations have agreed to set up a global fund where companies that benefit from the use of digital information of genetic resources share their profit with the traditional custodians of the resources. Developed countries have reluctantly agreed to the move. However, contribution to the fund is voluntary, raising doubts about its efficacy in near future

**VIBHA VARSHNEY** reports from the 16<sup>th</sup> Conference of the Parties to the Convention on Biological Diversity in Cali, Colombia



Performers at the opening  
ceremony of the 16<sup>th</sup>  
Conference of the Parties  
to the Convention on  
Biological Diversity on  
October 21, 2024





**W**E HAVE lived in this area for centuries and used the plants in the territory in a reasonable way, but the ecosystem is under serious threat now, says Luis Guillermo Izquierdo Mora, referring to Sierra Nevada de Santa Marta mountain range.

Spread over 17,000 sq km, in the South American nation of Colombia, Sierra Nevada de Santa Marta is the world's highest coastal mountain system located just about 40 km from the ocean. Some 30 rivers run down the range. Due to the varied extremes of altitudes and its tropical location, the range represents a near complete spectrum of climate zones, ecosystems, soils and forest types found in South America, and has fostered a remarkable diversity of flora and fauna. UNESCO says it is home to 600 botanical genera, 3,000 species of higher plants, 514 species of birds, 46 species of amphibians, 86 species of reptiles and 120 species of mammals. Many of these are endemic. Given the rich biodiversity and its characteristic features, Sierra Nevada de Santa Marta is often cited as the world's most irreplaceable nature reserve.

Mora is a member of the Arhuaco People, one of the four indigenous communities in the mountain range that depend on this biodiversity not only for food and medicine but also for rituals and spiritual needs. Nothing exemplifies this dependence more than *frailejón* (*Espeletia* sp)—an extremely slow growing shrub native to the country. Mora's community uses it in rituals for opening and closing of natural cycles such as birth, death or a girl's first period. In the local culture, the plant is considered equivalent to the father. *Frailejón* is known for contributing to the water availability—it captures water vapour from passing clouds in its spongy trunk and releases it into the soil through the roots. This helps create water deposits and lakes that eventually form rivers that provide water to the cities.

*Frailejón*, however, is under severe threat due to rising cases of forest fires and intensive



agriculture practices that use pesticides and destroy the land. It is illegal to practise agriculture in the protected biosphere, but some still do it. The ecosystem also faces risks from extractive industries, such as stone mining. "We believe that rocks are the bones of earth and by mining, the industries are breaking these bones," says Mora, who is the president of ICCA Consortium in Colombia, a global network of indigenous communities. He was in Cali, Columbia's most populous city, to attend the 16<sup>th</sup> Conference of the Parties (COP16) to the Convention on Biological Diversity (CBD). Some 190 nations took part in the event held from October 21 to November 1.

Over the two weeks, many issues crucial to Mora were discussed at COP16. His concerns found support in Columbia's President Gustavo Petro's plea during the opening of the high-level segment of the meeting, when he said that COP16 should emphasise on the value of life over money and on the need for global democracy over domination.

It was for democracy that the Kunming-Montreal Global Biodiversity Framework (KMGBF), adopted at COP15 in 2022, held





indigenous communities at the centre for the first time as it set four overarching global goals to protect nature (such as halting human-induced extinction of threatened species and reducing the rate of extinction of all species tenfold by 2050) and 23 environmental targets to be achieved by 2030. Some of these goals and targets, such as Target 3 that seeks to preserve 30 per cent of the planet's land and seas, were a point of contention, as some experts said that steps to protect land and seas could result in displacement and sidelining of communities.

COP16 has seen a step in addressing this concern. To support indigenous peoples and local communities (IPLC), a new permanent "Subsidiary Body on Article 8(j) and other Provisions" has been set up. The body will work on issues related to the implementation of article 8(j) and enhance the participation of IPLC in all Convention processes. Article 8(j) pertains to preservation and sustainable use of knowledge, innovations and practices of indigenous and local communities, and equitable sharing of benefits arising from the use of these. The working of the subsidiary

^  
The 2024 Convention on Biological Diversity was held in Colombia, a nation blessed with regions of great biodiversity, such as the Sierra Nevada de Santa Marta mountain range

body would be developed by the next COP.

In another landmark decision, Parties have adopted a new "New Programme of Work and Institutional Arrangements on Article 8(j) and Other Provisions of the Convention Related to Indigenous Peoples and Local Communities". The new Programme of Work "sets out specific tasks to ensure the meaningful contribution" of IPLC towards the three objectives of the Convention—(i) conservation of biological diversity; (ii) sustainable use of biological diversity; and (iii) the fair and equitable sharing of benefits—as well as in implementing KMGBF. Parties also decided to recognise the role of people of African descent in implementing the Convention.

The decisions have been celebrated. "This agreement allows us to strengthen our presence in major decisions and thus be able to propose actions more in line with our realities," Mora tells *Down To Earth*. "The establishment of the Permanent Subsidiary Body on Article 8(j) will provide a high level platform to further highlight the contributions of IPs and LCs to protection of the planet and share learnings," says Jennifer Corpuz, from International Indigenous Forum on Biodiversity, a global network of indigenous governments, non-profits, academics and activists.

COP16 has also taken the first step to operationalise a mechanism to share benefits earned from the use of genetic resources, digital sequence information (DSI) and traditional knowledge. This is KMGBF's Target 13. For this, a special fund, known as Cali Fund, has been set up (more on this later).

COP16 also saw major disappointments. The Parties could not reach a decision on Target 19 that seeks a new "Strategy for Resource Mobilization" to help secure \$200 billion annually by 2030 from domestic, international, public and private resources to implement national biodiversity strategies and action plans. Similarly, there was no discussion on Target 18—the redirection of the \$500 billion per year of subsidies that harm biodiversity. This would be taken up at a later meeting (see 'Status quo', p42).

# PROFIT AND PROTECT

A fund to share benefits accruing from use of digitised data of genetic resources was set up after exhaustive negotiations on the last day of the Convention

**T**HE FINAL plenary meeting on November 1—the last day of the 16<sup>th</sup> Conference of the Parties (COP16) to the Convention on Biological Diversity (CBD)—dragged on for 11 hours after the designated time without decisions on many agenda items. It had to be suspended due to lack of quorum as the delegates left to catch their return flights.

The major reason for this delay was the discussions on Target 13 of the Kunming-Montreal Global Biodiversity Framework (KMGBF), adopted at COP15 in 2022. The target seeks to increase the sharing of benefits with the communities earned from the use of genetic resources and digital sequence information (DSI).

DSI refers to genetic data such as nucleotide sequences (DNA and RNA) and protein sequences of organisms. The data can be used in

manufacturing drugs and cosmetics instead of the actual organism. But DSI's nonphysical nature (the data can be stored digitally) and use complicates the traditional methods of managing access and benefit-sharing established under CBD's Nagoya Protocol of 2014—an international agreement which aims at sharing the benefits arising from the utilisation of genetic resources in a fair and equitable way. Though Nagoya Protocol mandates that countries hold sovereign rights over their biodiversity, there is no clarity about these rights in case of DSI.

The first step towards benefit-sharing and ensuring that there is a significant increase of the benefits shared by 2030 (Target 13 of KMGBF) was to operationalise a multilateral mechanism. This has been agreed upon with the setting up of Cali Fund. The multilateral mechanism is a contradiction to the basic premise of CBD which says that countries have sovereign rights over their biodiversity. It supports bilateral agreements on access and benefit-sharing (ABS) with communities. But it is critical because large amounts of DSI are present in public repositories for which the source is not available and this has been put without the knowledge of the communities—a form of blatant biopiracy.

The multilateral mechanism, which is non-binding, says that those industries (in relevant sectors) whose income exceeds a certain threshold should contribute 1 per cent of

**The agreements at COP16 allow us to strengthen our presence in major decisions and thus be able to propose actions more in line with our realities**

**Luis Guillermo Izquierdo Mora,**  
President, ICCA Consortium,  
Colombia



**The Permanent Subsidiary Body on Article 8(j) will provide a high-level platform to highlight the contributions of indigenous peoples and local communities to protection of the planet**

**Jennifer Corpuz,**  
International  
Indigenous Forum  
on Biodiversity



profits or 0.1 per cent of revenue to the Cali Fund (see 'Cali Fund', p37). But the agreement on the multilateral agreement was not without what Susana Muhamad, the president of COP16, termed "real drama" on the final day of the Convention. This is how the negotiations unfolded.

Despite 12 days of discussions, Parties were not able to agree on much in the working groups and contact groups. A conference room paper could not be prepared and bilateral discussions and those with friends of co-chairs failed. President of COP16, Muhamad, prepared a draft text, called the president's text, which was discussed with the Parties on the last day of the meeting and clean text was brought in to the final plenary as the "L-Document" to be negotiated for adoption in the plenary late in the evening of the last day of negotiations.

This document was not acceptable to the developing countries. A small group reconvened to discuss the issues further. The group, however, could not agree on whether developing countries should continue to have sovereign rights over a DSI that has been made available in a public database, including a right to receive benefits arising from its use, should the country decide to exercise such a right. For example, a country could establish an open access national database available to the public under its national laws on access and benefit sharing (ABS) and derive benefits from its use. Despite the issue being unresolved, a final text was prepared for negotiations.

At the final plenary, many countries accepted the text. These included Norway, EU, Japan, Canada, South Africa, Mexico and Switzerland. Canada and Switzerland specified that they were happy with the "non-binding" agreement; that this was the first step; and that there was a need for national discussions on implementation. Panama and Peru had some reservations. Panama wanted full autonomy over the funds and wanted 10 per cent of the proposed fund to be earmarked for capacity building. Bolivia wanted a reference to "other knowledge systems" in the preamble. Still, both the nations accepted the text.

India, however, said it will accept the text only when its critical concerns are addressed.

## Cali Fund

Workings of the new fund to share benefits from DSI

- Industries involved in pharmaceuticals; nutraceuticals; cosmetics; plant and animal breeding; biotechnology; laboratory equipment associated with the sequencing and use of digital sequence information (DSI) on genetic resources, including reagents and supplies; information, scientific and technical services related to DSI on genetic resources, including artificial intelligence need to pay.
- Companies that, on their balance sheet dates, exceed at least two of three of the criteria (total assets: US \$20 million sales; US \$50 million; profit: US \$5 million) averaged over the preceding three years, should contribute to the global fund 1 per cent of their profits or 0.1 per cent of their revenue, as an indicative rate.
- While public databases, academic and public research institutions are not expected to make monetary contributions to the fund, they would need to ensure that the source of the genetic material and whether it has been procured legally can be determined.
- Other than the monetary benefits, users will also need to pay non-monetary benefits. These include support to requirements identified by the communities. The sharing of non-monetary benefits will be facilitated through an existing clearing house under the Convention, which will primarily provide information on demand for capacity-building needs, knowledge exchange, and the showcasing and reporting of ongoing non-monetary benefit-sharing activities.
- Users can make their payments directly to the fund or through a national authority. A certificate will be issued to the user when the money reaches the global fund. It will be used towards conservation and sustainable use of biodiversity, including through the delivery of activities described in national biodiversity strategies and action plans.
- At least half of the global fund will be set aside to support the self-identified needs of indigenous peoples and local communities, including women and youth through direct payments through institutions identified by indigenous peoples and local communities or through governments.
- As much as 10 per cent of the fund will be used to support technical development so the Global South/poorest of the poor countries have access to the tools and expertise necessary to fully participate and benefit from DSI on genetic resources.
- Allocations will be made using a formula that has been prepared by the secretariat. This would be finalised at COP17. Funding to Parties will be disbursed through direct allocations to countries, who will need to set up a body to receive these funds. The fund will be administered by the UN through its Multi-Partner Trust Fund Office.

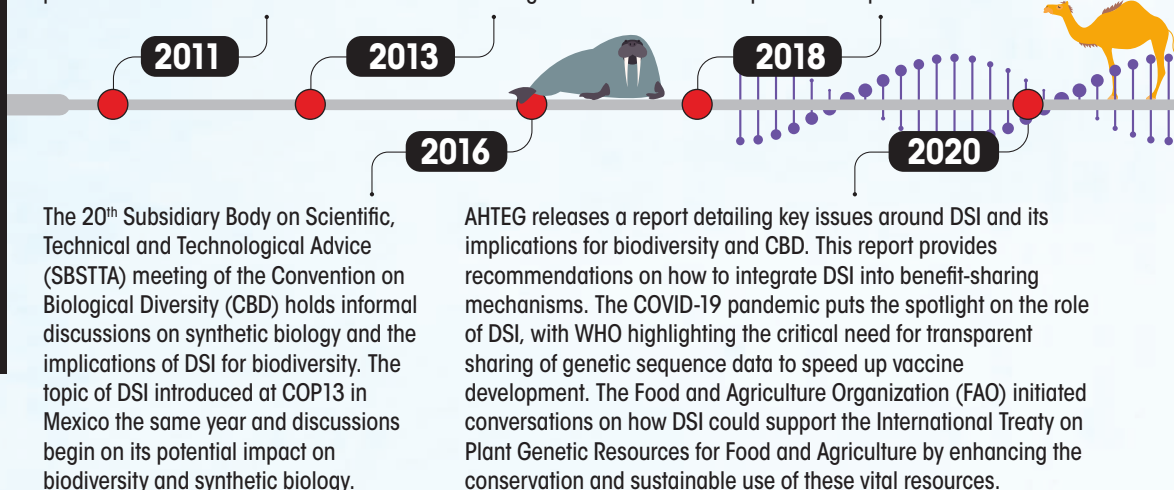
## EMERGING RESOURCE

Digital Sequence Information (DSI) is a relatively new resource being used in research instead of the actual organism. Here's a look at efforts undertaken by multilateral organisations to regulate DSI usage

World Health Assembly, the decision-making body of the World Health Organization (WHO), adopts Pandemic Influenza Preparedness Framework. This establishes guidelines for the sharing of influenza viruses and Digital Sequence Information (DSI) to enhance global preparedness for influenza pandemics.

The issue of DSI emerges in international discourse, at International Treaty on Plant Genetic Resources for Food and Agriculture, focusing on enhancing the multilateral system, which stalls the adoption of a new Standard Material Transfer Agreement.

During the 22<sup>nd</sup> SBSTTA, extensive discussions take place on the implications of DSI for the objectives of CBD. COP 14 in Egypt, CBD establishes the Ad Hoc Technical Expert Group (AHTEG) on DSI to study its implications and make recommendations for benefit-sharing mechanisms. Same year, WHO emphasises DSI's importance for public health.



India wanted to ensure that countries continued to have sovereign rights over the DSIs. B Balaji, secretary, National Biodiversity Authority, said that these points had been raised since the beginning of the meeting and that India had even sent a mail to the secretariat, but were still not included in the final text.

The atmosphere became tense with Muhamad asking India to reconsider and come back after she has heard from others. After this, more countries pointed out that they have reservations, even while agreeing to the text. These included Zimbabwe, Cuba, Brazil, Chile and Burkina Faso.

Brazil reminded the members of the bigger picture that UN Secretary-General António Guterres had painted at the inaugural session, when he said that the countries are discussing DSI is because the developing countries are being plundered as the scientific discoveries and economic growth derived from these are benefiting others. However, Brazil said that even while they were uncertain how these

mechanism would work, there is a need for a collective leap of faith and accepted in deference to the political mandate set at cop15.

The main dissent to the India's intervention came from Switzerland. The negotiator pointed out that changes in text would mean that they would no longer be able to support the decision. Norway too said that it is against the points that India plans to raise and that these are "red lines" for them. The country's negotiator asked India to show flexibility and accept the text.

The president announced a five-minute-break but the interlude dragged on for around 45 minutes. Observers at the venue said that during this time, executive secretary of the convention, COP-secretary, co-chairs of the contact group that negotiated DSI draft decision and other negotiators and observers surrounded the Indian delegation to bring them on board.

Finally, Muhamad announced at the plenary that what India wants does not affect the meaning of the text and agreed to put a phrase "without prejudice to the national obligation or





In August, CBD Secretariat highlights documents from the AHTEG at a meeting. Discord among the developing countries and the developed countries is visible. Developing countries want a system for accessing genetic resources and sharing of benefits earned from their use, along with equitable access to DSI. Developed countries prefer open access to DSI, suggesting that monetising DSI would be a distraction from research and inconsistent with CBD. WHO emphasises the criticality of DSI for pandemic preparedness, noting that timely sharing of data can enhance response times during outbreaks.

2021

2022

In September, FAO Governing Body adopts a resolution on DSI to address its role in food and agriculture. In December, COP15 adopts Decision 15/9 towards establishing a multilateral mechanism for benefit-sharing from DSI, including a global fund to ensure equitable distribution of benefits. WHO also integrates DSI into the Pandemic Treaty, advocating equitable access to DSI within global health strategies to ensure inclusive benefits during health crises.

2023

In July, the FAO Commission on Genetic Resources for Food and Agriculture considers DSI's role in food security and agricultural biodiversity. It informs that nearly 1.3 million scientific publications cite DSI, showcasing its significance in advancing agricultural science. In November, the first meeting of CBD's Ad Hoc Open-ended Working Group on DSI discusses key themes, sparking intense debates on monitoring, funding, data governance and community rights.

2024

In May, the 26<sup>th</sup> SBSTTA meeting discusses the implications of DSI for CBD and how DSI governance intersects with benefit-sharing obligations. The same month, the World Intellectual Property Organization adopts the Treaty on Intellectual Property, Genetic Resources and Associated Traditional Knowledge, which mandates patent applications to disclose the source of any genetic resources or traditional knowledge used in their inventions. The second meeting of the Ad Hoc Open-ended Working Group of CBD happens. In October, COP16 is expected to finalise decisions on the operationalisation of the multilateral fund. At COP16, Parties agree on the mechanism of operationalisation of the Cali Fund.

ABS" into the annex, "Modalities for operationalizing the multilateral mechanism for the fair and equitable sharing of benefits from the use of digital sequence information on genetic resources, including a global fund".

The first point of the annex now states: "The multilateral mechanism for the fair and equitable sharing of benefits from the use of digital sequence information on genetic resources covers, without prejudice to the national obligation or ABS, digital sequence information on genetic resources..."

The other change was the inclusion of the phrase "and national legislation" to para 21 so that it reads "Where appropriate and subject to national circumstances and national legislation, at least half of the funding of the global fund should support the self-identified needs of indigenous peoples..."

India pointed out that the wording should be "national legislation" and not "obligation" in both these places.

Though this point was there in the preamble

of the document, it was missing in the annex on operationalisation. Adding the line to the annex clearly makes it part of the mechanism. The widespread displeasure shown by the developed countries such as Switzerland, Norway and EU indicate that this change is significant.

Switzerland was still not in favour of the change and pointed out that for the fund to work, there has to be an incentive for the companies to use this mechanism. There has to be assurances that they are not hindered by national legislation.

Switzerland pointed out companies might not want to pay to the multilateral fund unless there not assurances that they would not have to pay again due to national legislation. EU called this change "unfortunate". Both the presidency and UK, the negotiator from the country William Lockhart, who was also the chair of the working group on DSI, reassured developed countries that the addition does not change the meaning of the text. Finally, Switzerland accepted India's change, saying

that these modalities will be discussed again later. There was jubilation on the stage.

Meanwhile, various developing countries chipped in the discussion on how the concerns that they had raised in the meetings were also not included in the final text. Panama's highlighted that its demand to earmark 10 per cent of the fund for capacity building has been removed at the last minute. The negotiator said that there is a lack of transparency in the processes and small countries are always expected to give in. "Our contribution have not been sufficiently considered even though we have consistently demonstrated a strong commitment to the issue from the beginning. Without a firm commitment to capacity building and support at the global level of the mechanism we are setting small countries like mine up for failure" he said.

With this, a multilateral mechanism for benefit sharing in form of a voluntary global fund—Cali Fund—was operationalised. "Overall, it was pleasing to see that developing countries did not give up their sovereign rights over genetic resources, including on DSI, on a promise of a multilateral mechanism. Since the fund has been established, large companies can start contributing to the fund. Meanwhile, countries should continue to work to reduce the danger of digital biopiracy and improve governance and compliance measures," Nithin Ramakrishnan, senior researcher at international non-profit Third World Network, tells DTE.

**Digital Sequence Information has to be defined clearly. Firms have rules and they will not contribute to the fund unless there is clarity**

**Hartmut Meyer**, project leader, GIZ GmbH

### NEED FOR THE MECHANISM

In absence of a multilateral mechanism, industries can use publicly available DSIs without sharing benefits. Sample this.

In March 2020, the African Diversity and Inclusion Center, along with Pelum and Andes, both non-profits critical of genetically modified organisms (GMO), examined the case of a genetically modified (GM) potato developed by the International Potato Center in Peru. This potato, which has enhanced resistance to mildew, was created using genes from the Latin American variety for the purpose of commercialising it in Uganda and Rwanda. The modified potato has three specific genes sourced from plants in Latin America, but two of the genes were not collected directly from the plants. Instead, they were synthesised from genetic sequences found in the US GenBank database. The researchers claimed commercial rights to these genes, even though they were synthesised from publicly available sequences. These two genes are Rpi-vnt1.1 and Rpi-blb2 derived from *Solanum venturii*, collected in Argentina and *Solanum bulbocastanum* collected from Mexico respectively. Rpi-vnt1.1 was sequenced by Sainsbury Laboratory in the UK and stored in GenBank in 2010, while Rpi-blb2 was collected before 1957 and sequenced by researchers in the Netherlands, and added to GenBank in 2005. The financial and scientific collaborations behind the GMO potato involve various entities, including major foundations and companies from the US and the UK.

**Large companies can start contributing to the fund, while countries work to reduce the danger of digital biopiracy and improve governance and compliance measures**

**Nithin Ramakrishnan**, senior researcher, Third World Network





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### QAL - 1

Clause No. 6,7,8 as per EN14181  
Clause No. 6,7,8,9,11 as per EN15267-3  
Clause No. 10.1....10.8, 10.9, .10, .11, .12, .13,  
.14, .16, .17, .19 as per EN15267-3  
Clause No. 12.1, 12.2, 12.3, 12.4, 12.5, 12.6,  
12.7 as per EN15267-3

### QAL - 2

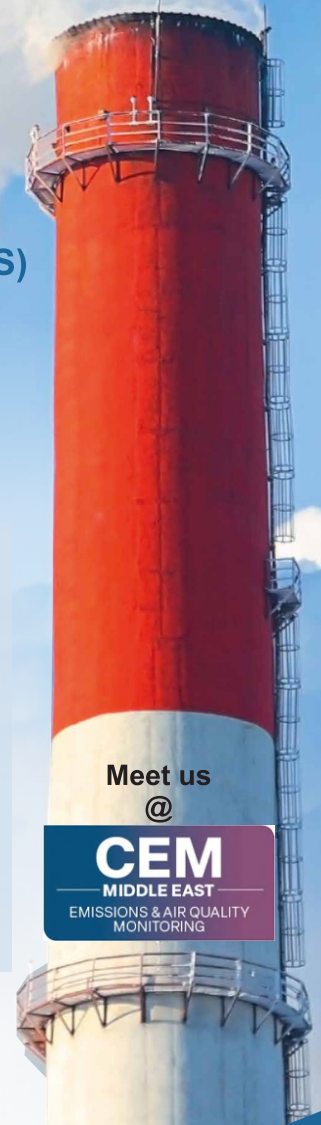
Clause No. 6 as per EN14181  
Clause No. 8.3 as per EN15259

### AST

Clause No. 8 As per EN14181  
Clause No. 8.3 as per EN15259

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However, there is little mention of benefit sharing with local farmers.

Without the phrase added by India, it was likely that everyone could use the biodiversity and instead of following the Nagoya Protocol directives, simply donate to the multilateral fund. India's intervention means that if the use of DSI is governed under national ABS laws, regardless how someone accessed the same and whether through database or not, the benefit sharing should be based on the national ABS laws. The Parties opposing India seemed mostly interested in the certificates that they would have received after they contributed to the Cali Fund as this would legitimise their use of biodiversity. Since this contribution is voluntary, users may or may not put in the money in the fund. Even during the plenary, Switzerland and some other countries were clear that the agreement is "non-binding".

## IT'S NORTH V SOUTH

Most of the users of DSI are in the Global North. Not only that, the databases that store these sequences are in the developed countries. These open-access databases store vast amounts of genetic data. There are more than 1,700 databases and repositories of biological data around the world. The International Nucleotide Sequence Database Collaboration, which consists of three large databases (European Nucleotide Archive based in the UK; GenBank based in the US and DNA Data Bank of Japan based in Japan), receives over 23 million sequences per year.

These are sequences of materials that have been mostly accessed without following the processes set under the Nagoya Protocol. The databases do not indicate the exact place from where the material has been sourced or include information on whether it has been sourced with mutually agreed terms with the communities that hold the rights over it. Without this information, users of sequences from these databases do not have any compulsion to share benefits with the communities that have preserved these. Weak legislation benefits the users. Also, since the database is open source, it is difficult to identify the users.

One such user is the research community

## STATUS QUO

The world has not moved much in protecting its biodiversity since the last Conference of the Parties to the Convention of Biological Diversity held in 2022

■ By the end of COP16, a total of 44 Parties submit revised National Biodiversity Strategies and Action Plans, while 119 Parties submit revised National Targets, representing around 63 per cent of countries. Progress has not been much per se.

■ "Protected Planet Report 2024" by the UN and a UK non-profit reveals that the global coverage of protected and conserved areas has reached 17.6 per cent of terrestrial and inland waters and 8.4 per cent of marine and coastal areas. The data from May 2021 indicate that 16.64 per cent of land and inland water ecosystems, and 7.74 per cent of coastal waters and the ocean, were protected. The target, as per the Kunming-Montreal Global Biodiversity Framework (KMGBF), adopted at COP15 in 2022, is to have 30 per cent of land and waters under protection. The need is to double the protection on land and triple that in marine areas by 2030 to meet the target.

■ Biodiversity continues to be under threat as indicated by IUCN's first Global Tree Assessment, with 38 per cent of the world's trees at risk of extinction. Decision taken to increase the sharing of Benefits From the use of Digital Sequence Information (DSI) and a multilateral mechanism for sharing benefits from the use of DSI has been set. The users may put in a donation in the voluntary Cali Fund. This could be 1 per cent of profits or 0.1 per cent of revenue. At least half of this is expected to support the self-identified needs of indigenous peoples and local communities, including women and youth within those communities.

■ Discussion on resource mobilisation postponed to a later meeting. The Global Biodiversity Framework Fund has received a total of \$396 million from 12 sovereign and sub-national government. According to KMGBF target 19, there is a need to mobilise \$200 billion per year for biodiversity from all sources including \$30 billion through international finance by 2030.

represented by the DSI Scientific Network (DSN), created in 2020. DSN represents 95 different DSI-using scientists who want to ensure that they can continue to use the data. DSN is funded by grants by organisations such as Alliance of German Scientific Organizations; WILDSI which is funded by Government of Germany; the Norwegian Agency of International Development; the US' government's National Institutes of Health; and the Rockefeller Foundation based in the US.





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# REIMAGINING THE BUILT ENVIRONMENT

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**DATES:** DECEMBER 03-06, 2024 | **LAST DATE TO APPLY:** November 25, 2024**VENUE:** Anil Agarwal Environment Training Institute (AAETI), Tijara, Alwar, Rajasthan

India has committed to a net zero carbon emission target by 2070. The role of the built environment in achieving this target cannot be ignored, as it accounts for around 39 per cent of global energy-related carbon emissions. At present, the built environment is characterised by low efficiency, high emissions and a non-circular resource-intensive consumption pattern. According to the Circularity Gap Report 2023, only 7.2 per cent of the world economy is circular, indicating that more than 90 per cent of materials are either wasted, lost or remain unavailable for reuse. Amidst all this, challenges posed by climate change exacerbate the difficulties and present newer ones.

India—the world's fifth largest economy—is rapidly urbanising; emissions are expected to increase seven times in future. To address these challenges, it is essential to implement techniques and innovative approaches such as greening the construction sector, promoting material circularity, adopting climate-resilient designs, and climate-proofing for the built

environment, among others. Future built environment will need to ensure that it consumes minimal resources while maintaining circularity in material flow. A resilient, energy-efficient and resource-efficient built sector could be a key contributor in achieving India's national goals of reducing the emission intensity of India's GDP by 45 per cent below 2005 levels by 2030, and achieving net zero.

CSE's Anil Agarwal Environment Training Institute (AAETI) is offering a residential course to provide the participants with holistic knowledge for designing climate-resilient and resource-efficient built environments. The course will be conducted at AAETI, a sustainable, state-of-the-art campus which acts as a learning tool for building design practices and understanding of sustainable building concepts.

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- Good practices from Indian cities working on C&D waste and dust control

**COURSE FEES**

**₹28,000** (sponsorships and discounts available subject to satisfactory fulfilment of application form)\*

\*Course fee includes tuition fee, external expert lecture sessions, training materials, boarding and lodging, and transport from New Delhi to AAETI and back.

**WHO CAN APPLY**

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According to DSN's position paper for COP16, non-commercial users should have to contribute to non-monetary benefits alone and by putting the sequence in an open source database, they are fulfilling that requirement. They want the money in the Cali Fund to be used for capacity building to increase the data in the data banks, especially from under-represented areas in the world. They agree that while database practices can be improved, database managers cannot be the ABS police. The main reason for this is that only about 28 countries have the Nagoya Protocol system in place.

For DSI's commercial users, DSN advocates that companies should contribute a percentage of their profits to the global fund. They say this will capture benefits from new, unpredictable uses of DSI, including future artificial intelligence applications. They say that this option can help harmonisation of DSI benefit-sharing across different UN fora. This is important considering that Food and Agriculture Organization of the United Nations has been trying to understand the potential implications of the use of DSI under the International Treaty on Plant Genetic Resources for Food and Agriculture. Similarly, DSI is part of World Health Organization's Pandemic Agreement; United Nations Convention on the Law of the Sea's Biodiversity Beyond National Jurisdiction agreement; and World Intellectual Property Organization's Treaty on Intellectual Property, Genetic Resources and Traditional Knowledge (see 'Emerging resource', p38).

This harmonisation, definition of DSI and non-monetary agreements are likely to be discussed at later CBD meetings. "DSI has to be defined clearly because without clarity, users would not enter the mechanism. Lack of definition is an issue as the fund is voluntary. Companies have rules and they will not contribute to the fund unless there is clarity," Hartmut Meyer, project leader at GIZ GmbH, Germany, tells DTE. In light of the decision on the setting up of the multilateral mechanism, Amber Hartman Scholz, head of department, science policy and internationalisation, Leibniz Institute, Germany and member of DSN, says that as scientists at universities and



public research institutes will be responsible for sharing non-monetary benefit like training, capacity building and open data, knowledge and infrastructures, DSN will now provide ideas for how non-monetary benefits can be better captured and connected with what countries need.

However, all researchers are not opposed to sharing benefits directly with communities. Basecamp Research, a London-based startup has set up a system of accessing genetic material from indigenous communities following the PIC and MAT processes, though the terms of the agreements are not in public domain. These materials are then sequenced and put up in a database but only after all information on where the material has been collected from and terms of use have been put in place. This group is funded by pharmaceutical companies such as Roche and Unilever.





## UNHAPPY PHARMACEUTICALS

Pharmaceutical industry is not happy with the decision. In a press release, director general of International Federation of Pharmaceutical Manufacturers and Associations (IFPMA), David Reddy, said that “the decision adopted does not get the balance right between the intended benefits of such a mechanism and the significant costs to society and science that it has the potential to create”. He said, “The ability to rapidly use scientific data known as ‘digital sequence information’ is essential for developing new medicines and vaccines. Any new system should not introduce further conditions on how scientists access such data and add to a complex web of regulation, taxation and other obligations for the whole R&D ecosystem—including on academia and biotech companies. New technologies that use DSI can contribute to conservation and sustainable use of biodiversity and should

^  
The Convention's decision to create a fund for benefit-sharing and to engage more indigenous peoples and local communities in its functioning have received praise

be encouraged.” The federation represents over 90 pharmaceutical companies and associations.

Recently, British-Swiss firm AstraZeneca, a member of IFPMA, has reportedly threatened to cut jobs at its UK operation if the government enforces a global push to make companies share profits derived from nature's genetic codes. The statement was made at a UK government meeting held to discuss a proposed new global levy on drugs derived from the digital forms of biodiversity. A spokesperson for AstraZeneca later denied that the comments were made by their representative.

This does not look very encouraging. The Parties are likely to discuss this again at the forthcoming CBD meetings. If industry does not put in the money in Cali Fund, all the effort could go to waste. Maybe, strengthening the implementation of the Nagoya Protocol would have been easier. [DTE](#) @down2earthindia

# The patent truth about women inventors

Women scientists have been in the headlines for their life changing discoveries but they are way behind in inventions

**T**HE PASSING away of Rohini Godbole, particle physicist and a passionate champion of women in science, has prompted ruminations on how much of a role women scientists play, here and globally. Godbole was an honorary professor at the Centre for High Energy Physics at the Indian Institute of Science in Bengaluru, and she was one of those rare women who opted for theoretical physics unlike the generally preferred experimental physics. In her case, it was more difficult to make it in the world of science, as she has related, because of her chosen specialisation: theoretical high energy physics. That is a common refrain across the world never mind the field women have opted for. They have had to struggle against formidable odds to pursue their ideas and research obsessions.

A telling case is that of biochemist Katalin Karikó, who has been hailed as the woman

who shielded the world against the COVID-19 pandemic, caused by novel coronavirus SARS-cov-2. Along with immunologist Drew Weissman, she discovered how to enable messenger ribonucleic acid (mRNA) to enter cells without triggering the body's immune system. Their critical research laid the foundation for the mRNA vaccines that helped fight against the COVID-19 pandemic. Hers was a classic struggle. Starved of funds and institutional support, Karikó was always dependent on a senior scientist to take her on as a research assistant and faced stark uncertainties as an untenured professor (see 'Katalin Karikó and the innovation issue', *Down To Earth*, September 1-15, 2021). That column was written two years before she was awarded the Nobel Prize in Physiology or Medicine along with Weissman.

It would seem not much has changed since the days of the brilliant and exceptional Marie Curie who made a mark in cutting-edge scientific research despite tremendous odds more than a century before Karikó did. Curie was honoured with a second Nobel Prize in 1911, the only woman to have received two Nobel awards and the only scientist to have earned this in two different sciences—chemistry and physics. Like Curie who was Polish and did her research in France, Karikó is an émigré from Hungary who has gone back to teaching at the University of Szeged in her native country. But that is not really the issue although Curie did face an attack on her house by mob demanding her expulsion after the death of her husband Frenchman Pierre, who shared the Chemistry Nobel Prize with her in 1903.

The simple truth is the biases against women scientists persist to this day because of the male-dominated nature of scientific establishments across the world. But that is to





ignore the policy changes that have been introduced, transformative in some places, to encourage women in STEM (Science, Technology, Engineering, and Mathematics), both in education and the workplace. Such biases are more prevalent in conservative societies such as India's even though we might see a scattering of senior women scientists in a few fields such as space research.

It is a global phenomenon. Various reports give slightly different figures of women in STEM but none of them offers cause for cheer. A World Bank report on global trends in the participation of women and girls in STEM said that the poor representation of women in STEM is prevalent in every region. While graduation rates are higher among women, they are less likely to be found in STEM fields, especially in engineering, physics and ICT (Information and Communication Technology). The more depressing fact that emerged is that women who studied in STEM fields were less likely to enter STEM careers, and to exit these careers earlier than men. It also found that women in STEM careers published fewer papers and, perhaps not surprisingly, were also underpaid. The final figures were stark. Women comprised 29.4 per cent of the STEM workforce in 146 nations evaluated in the 2023 Global Gender Gap Report of the World Economic Forum (WEF). That figure pertains to only entry-level workers. At high-level leadership roles women constitute just 12 to 17 per cent of STEM jobs.

As a result their showing on invention was pathetic. Only 17 per cent of the inventors holding international patents were women in 2022, says an analysis by the UN's World Intellectual Property Organization (WIPO). So far behind were the women that it would take women almost four decades more to catch up with men in achieving gender parity in international patenting based on current trends. That is, until 2061.

But there was a paradox in India. The World Bank sample study found that the

country had the highest level of 42.3 per cent of those in STEM education, much higher than in the US (34 per cent), Australia at 32.1 per cent and Germany at 27.6 per cent in 2017. What the report did not say was that women were concentrated in life sciences with a negligible presence in engineering and technology. As they moved up the professional ladder, women simply tend to fall off. They accounted for just nine per cent of the fellows in the three top Indian science academies.

Personal issues like family concerns may be one of the top reasons why there are few women in the STEM workforce, but this is not to deny the biases and systemic barriers women face in the workplaces and that such biases affect STEM products and innovations.

And yet one cannot help wondering why

**And yet one cannot help wondering why there are no women made of the steel and passion of a Marie Curie or a Karikó in India. After all, we have had exceptional women scientists and inventors in the last century**

there are no women made of the steel and passion of a Marie Curie or a Karikó in India. After all, we have had exceptional women scientists and inventors in the last century when there was no enabling environment whatsoever for them. It's important to remember one such extraordinary figure in these highly polluted times—Anna Mani. She is little known in India although the Keralite was one of the best regarded weather

scientists in the world. Mani, a physicist by training, breached many barriers to pursue her passion for research and make path-breaking contributions. She is best remembered for making instruments to measure the weather starting in the 1940s, and for playing an important role in helping scientists to monitor the ozone layer. That was in 1964 when she created the first Indian-made ozonesonde, an instrument that measures the presence of ozone up to 35 km above the ground. And way ahead of her times she ventured into two virgin areas: solar energy and wind power. A biographer says this of Mani: "She made light of the difficulties and discrimination she encountered as a woman scientist and was disdainful of victim politics."

That perhaps says it all. [DTE](#) [@ljishnu](#)



# INTEGRATED ONLINE AND ONSITE TRAINING ON ENVIRONMENTAL IMPACT ASSESSMENT

CSE is conducting an integrated online and onsite training programme on EIA. The training programme will comprise of two parts: Basic learning (online platform) and Advanced learning (at our residential campus). The course is designed to provide an overall understanding of the EIA process which includes theoretical knowledge via lectures from experts and firsthand experience through group exercises, discussions and case studies.

## PROGRAM DESIGN

### PART A

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- Includes sessions on methodology for preparing an EIA, approach for baseline data collection, identification and assessment of impacts along with the Environmental Clearance process.
- Conducted on Moodle Platform where participants will be provided with pre-recorded reading / audio-visual training material which they are expected to self-study as per their convenience. The course material will be for the duration of 2 hours/day

### PART B

#### ADVANCED LEARNING (ONSITE)

- Includes practical experience on assessing impacts for different sector projects.
- Developing Environmental monitoring & management plans;
- Reviewing of EIA reports;
- Understanding the intricacies of the EIA system;
- Working on case studies through group exercises and role play;
- Discussion and knowledge sharing with experts;
- Conducted at CSE's residential campus, Anil Agarwal Environment Training Institute (AAETI) in Tijara, Alwar, Rajasthan.



COURSE FEES

#### PART A

**INR 3000** (Indian participants)  
**USD 100** (Non-Indian participants)

#### PART B\*

**INR 25,600/-** (double occupancy)  
**INR 28,000/-** (single occupancy)

\* Fees includes accommodation, food, training material and travel from Delhi to the training center and back.



COURSE DATES

#### ONLINE PART

**January 14-23, 2025**

#### ONSITE PART

**February 18-21, 2025**

### WHO CAN APPLY

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# Palette

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Extreme weather events will make poverty chronic **P58**

## RECOMMENDATIONS

### EVENT

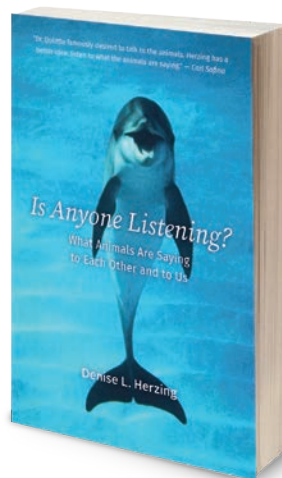


India is home to a myriad artisan communities, each with a unique take on craft-making. But these indigenous handicrafts are fast losing space to cheaper, machine-made alternatives. To celebrate and highlight the country's traditional handicrafts and their makers, Panjim, Goa, will host a three-day conclave in early December. Spearheaded by 200 Million Artisans that works to boost the country's handicraft economy, Kula Conclave will connect artists with enterprises that can help them access the finance and networks they need to grow. The focus of the conclave this year, set to be held from December 2 to 4, is sustainability and inclusive innovation. To know more about the event and secure an invite, visit [www.kulaconclave.com](http://www.kulaconclave.com).

### BOOKS



The world's ice cover is arguable the most vulnerable target of global warming and climate change. For centuries, communities and countries have relied on the consistency of the hydrological cycle for livelihood, environmental research and large economic benefits. But as this cycle shows rapid changes and disruptions, it may be time to think beyond ice. *After Ice: Cold Humanities for a Warming Planet*, edited by researchers Rafico Ruiz, Paula Schönach and Rob Shields, collates different perspectives on the future of a planet that is losing its ability to cool.



We know that humans are not the only species with language; plants, birds, insects and other mammals all have their own way of communication. What scientists are trying to understand is interspecies communication—how different beings talk to each other even without knowing the same language. In *Is Anyone Listening?*, Denise L Herzing, a researcher of dolphin communication, explores animal communication and why we should pay attention to what non-human species are trying to tell us.



# Water diviners

A network of over 1,000 women in villages of Bundelkhand has managed to achieve great feats in water conservation

**BHAGIRATH, CHHATARPUR, MADHYA PRADESH**

**W**E WOULD go to fill water from the village's only hand pump at night to avoid getting into fights with people belonging to upper castes," recalls Kiran Ahirwar, narrating the ordeal she used to face in accessing water.

Kiran is a resident of Agrautha village in Chhatarpur district of Madhya Pradesh. Located in the Bundelkhand region, the village has always been water scarce. The government had constructed

a pond in the village to store water during rainfall. "But it mostly ran dry because of low rainfall. We, therefore, decided to create a channel to direct the runoff from an adjacent hill to the pond. The construction of the channel required cutting through a hill, but we did it. The huge 30 hectare pond got filled in the first couple of bouts of rain," Kiran says. Kiran is a *jal saheli*, one of the over 1,000 cadre of women who work in their villages on

Women from villages in Lalitpur district at the Barua river that they helped revive in 2020

PHOTOGRAPH COURTESY: PARMARTH SAMAJSEVI SANSTHAN





issues relating to water.

Sanjay Singh of Bundelkhand-based non-profit Parmarth Samaj Sevi Sansthan, who has played a crucial role in the revival of waterbodies in the region, says, “I got the idea of *jal sahelis* during one of my interactions with a woman who said that location of all water resources in her village are decided by men, while the responsibility to arrange water for households is borne by women.” Now, under the model, we encourage women in villages to get involved in water-related issues and work with the village panchayat to get their problems resolved. The women select the most active amongst them as the *jal sahel*, says Singh.

Started in 2011 in three districts of Bundelkhand, the *jal sahel* network now includes more than



**“I was elected as the village head because of the works done during my tenure as my village’s *jal sahel*. Today, the village has nearly resolved all its water-related problems”**

Maya Singh, pradhan and *jal sahel*,  
Mau Masania village



**“We do not just work towards water conservation, but also get decisions taken in our ‘*pani panchayats*’ incorporated in other developmental works undertaken in the village and try to ensure that they get done”**

Pappi Bai Ahirwar, *jal sahel*, Bhelda village

1,100 women in six districts: Jalaun, Hamirpur, Jhansi and Lalitpur in Uttar Pradesh and Chhatarpur and Tikamgarh in Madhya Pradesh.

The *jal sahelis* have achieved some remarkable feats. “When we announced to the village our decision to cut through a hill to ensure supply of water to the pond, men in the village laughed at us. Even our family members did not believe that we could do it” says Kiran. The women devised ways to achieve the target and did all the work themselves—from getting government clearance to arranging tools. “Cutting through the hill required permission of the forest department, for which a group of women from the village met the district forest officer. The officer agreed on the condition that no machines should be used in the work. So, we arranged for the tools and, with the help some 300 women from Agrautha and nearby villages, worked cut through the hill,” she recalls. The channel is 107 m long and 3.5 m deep. The work started in

2018 and took 18 months to finish.

The *jal sahelis* also set their own agenda. In the adjacent village of Bhelda, for instance, *jal sahelis* have planned to undertake five actions to conserve rainwater this year. “We have decided that every house will construct a soak pit, plant five fruit-bearing tree, use wastewater to irrigate kitchen garden and provide help in fish farming in the village pond,” says Pappi Bai Ahirwar. Some 20 women in the village are involved in water conservation works and regularly hold meetings that they call *pani chaupal*.

## MAJOR WORKS

The achievements of *jal sahelis* are not limited to village-level works, but also include big projects, such as river revival. Sample this.

A few kilometres from Bhelda runs the Bachhedi, a seasonal river that passes through 12 villages in the district, travelling a distance of nearly 30 km before merging into a tributary of the Yamuna. The





Women of Agrautha village in Chhatarpur cut through a hill to devise a channel that directs runoff during monsoon to a pond

Agrautha pond and several other waterbodies in the area also merge into the Bachedi when they overflow. But the river would always run dry shortly after the monsoon. To ensure its longevity, *jal sahelis* of the district undertook a major project in February 2018. Under the

initiative, they built seven check dams, desilted five other check dams, constructed waterbodies at 14 locations and planted some 2,000 trees near the river. The project that started in February 2018 and was over in March 2023, used funds under the Mahatma Gandhi

Employment Guarantee Scheme. The result was that the river became full of water in 2023 and remained so the entire the year. This helped irrigate over 200 ha of farmland.

Revival of the Khudar river was another similar project. The seasonal river emerges in Chhatarpur and meets the Ken in the same district after travelling 44 km. The river started drying around 2000 and went completely waterless in 2020. “As a result, all the wells and hand pumps in the village dried up. The situation was so bad that we were dependent on water tankers,” says Kirat Singh Yadav, member of Mau Masania’s “pani panchayat”. To overcome the water scarcity, *jal sahelis* and residents of Beniganj, Bamnaura, Mau Masania and Dhawaad villages set up stop-gates at 12 locations and stop-dams at 10 locations. “This controlled the flow of water and revived the river. The river now helps irrigate over 400 ha of farmland,” says Yadav.



**“When we announced to the village our decision to cut through a hill to ensure supply of water to the pond, men in the village laughed at us. Even our family members did not believe that we could do it”**

**Kiran Ahirwar**, *jal saheli*, Agrautha village



**“First as *jal saheli* and then I as village pradhan, I got soak pits constructed to recharge groundwater near 15 locations to prevent water runoff from getting wasted”**

**Babli Adivasi**, pradhan and *jal saheli*, Gunjaura village





Residents of Mau Masania village at the Khudar river. The seasonal river went dry in 2020 but has been revived and now carries water all year

## THE MIRACLE OF WATER

The biggest benefit of revival of rivers and ponds is that many wells and hand pumps in the arid region that had gone dry have also come alive. For 50-year-old farmer Prem Lal Lodhi of Agrautha village, this was no less than a miracle. His village has nine hand pumps and three wells set up by the government, and 156 private wells. Till about 2018, only a few of them were functional. Prem Lal tells *Down to Earth* since the revival of the pond, water has also started seeping into the drain that passes by his field. By stopping the drain water by building check dams at three places, the groundwater level has also improved. There are two such drains in the village that originate from the pond, on which seven check dams have been built with the initiative of *jal sahelis*.

Availability of water throughout the year has inspired Prem Lal and another 50 farmers in the village to grow three crops in a year, which

includes moong as a zaid crop in summer, paddy, sesame, urad, peanuts in kharif and wheat, mustard and gram in rabi. Prem Lal says four years ago, his total annual income from his 22-hectare farm was just ₹2-3 lakh, which has now increased to ₹9-10 lakh.

“The river’s revival has also reduced migration to cities by 80 per cent,” says Narendra Singh of Mau Masania, who had left the village decades ago to teach at a coaching centre in Chhatarpur and has now returned. “I earned ₹5 lakh annually as teacher, but now I can earn more as a farmer in my village,” he says. “The river’s revival has trebled the productivity of my fields,” says Pradeep Singh of the same village.

Sattu Ahirwar, a 55-year-old farmer of Bhelda village, also narrates a similar story. In 2019, following the decision of the village’s *pani panchayat*, the pond adjacent to Sattu’s 4-hectare farm was rejuvenated. Since then, Sattu’s well in the field has revived

and holds water throughout the year. Sattu has started growing two crops in a year. Showing the well to *Down To Earth*, Sattu admits that because of water, his younger brother and two nephews, who used to migrate to cities for about nine months in a year, now go out only for three months, that too after sowing the rabi crops. He says because of water availability, the heads of buffaloes in the village has increased three times to 150.

Babli Adivasi credits her work as *jal saheli* for her election as the *pradhan* of Gunjaura village in 2022. “First as *jal saheli* and then as *pradhan*, I have installed soak pits at 15 locations in the village to ensure groundwater recharge,” she says. Like Babli Adivasi, in Mau Masania village, *jal saheli* Maya Singh has also been elected as the village head. “I was elected only because of the works I had done as a *jal saheli*. Today, the village has resolved all its water problems,” says Singh. **DTE** ☒ @down2earthindia

# 'Even if climate change did not exist, India would be an environmental disaster zone'

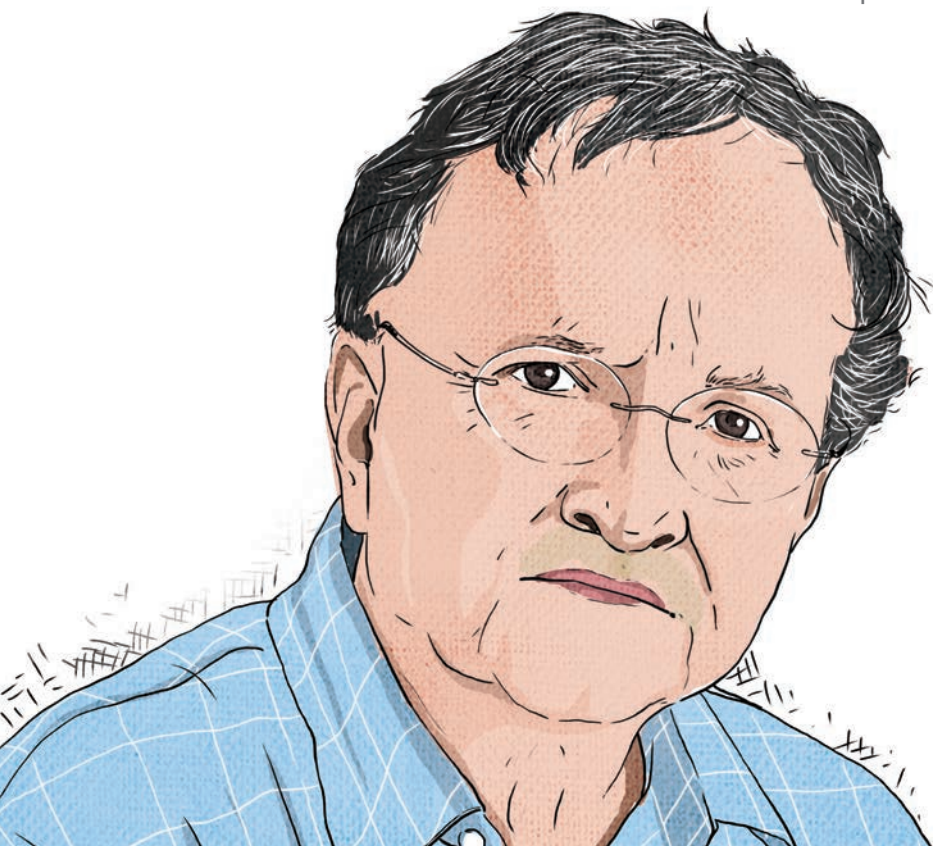
Historian and environmentalist **RAMACHANDRA GUHA**'s latest book, *Speaking with Nature: The Origins of Indian Environmentalism*, profiles 10 pioneering thinkers who wrote during British India or in the immediate years after Independence on the dangers of environmental abuse in the Indian context. Some of these thinkers will especially interest the young, who are much more environmentally aware than the previous generations, Guha tells **RAJAT GHAI**. The actions and activism of the young will translate into pressure on the government and the industrial classes who are the main polluters, says the author.

Excerpts:

**Post-independent India looks similar to its predecessor. The exploitation of resources to fuel growth continues and most of our grassroots resistance is around land, water and forests. In your view, is the process that started in British India continuing, with just a change in characters?**

It has actually intensified. The British brought modern forms of industrialisation—energy use, centralised and polluting technologies—to India. Some of the early figures in my book like Rabindranath Tagore, Radhakamal Mukherjee and some of the Gandhians, writing in the 1920s and 1930s when we were still a colony, said when India got its political independence, it had to chart its own path to economic development that is mindful of its resources, population and ecological constraints. India cannot blindly follow the energy-, capital- and resource-intensive centralised model of industrial development. The pioneers I profile in my book argue for an alternative path very persuasively and in great detail.

Unfortunately, they were ignored. In the 1950s and 1960s, the first two-and-a-half decades after its independence, India continued an extractive model of industrialisation with greater intensity. And it was not done purely out of greed but rather out of a mistaken belief that we were





colonised because we were economically and industrially inferior and to hold our own in the world, we have to catch up with the West and maybe equal them.

But this was a deep misunderstanding of our peculiar nature, our peculiar ecological configuration, the fact that so many millions of Indians depend on sustainable natural resources for their livelihood.

Movements like Chipko reignited the debate and there is a third wave of the debate that is now coming up, to which my book hopes to contribute.

**How do you foresee the “third wave of environmentalism” as you have defined it in the book? Is climate change an existential threat? There is also the Anthropocene, an epoch defined by human activities. In this context, will the “third wave” be a kind of redemption?**

Historians are not in the business of prediction. What I have tried to do is study the past to illuminate the present. But I cannot project into the future. What I am saying through this book is that in our political history, intellectual traditions and national movement, we have intellectual exemplars who can inspire and guide us and deepen our thinking of what India needs. How these ideas are taken forward, I cannot say.

But I will say one thing. One of the implicit arguments of the book is that even if climate change did not exist, India would be an environmental disaster zone. I am speaking to you in Delhi in the last week of October. I came today from my hometown, Bengaluru, where

the air quality index is 60. It is 360 in Delhi. And it is going to get worse. This has got nothing to do with climate change. Air pollution and its impact on health, particularly of the working poor, is independent of climate change. The depletion of groundwater aquifers in Punjab and elsewhere is independent of climate change. So is the death of our rivers. Deforestation and decline in biodiversity are happening through misguided policies, independent of climate change. So, even if climate change did not exist, we would be facing an existential crisis. Climate change makes it worse because the unanticipated consequences of a flood, a fire and a drought make

**AIR POLLUTION AND ITS IMPACT ON HEALTH, PARTICULARLY OF THE WORKING POOR, IS INDEPENDENT OF CLIMATE CHANGE. THE DEPLETION OF GROUNDWATER AQUIFERS IN PUNJAB AND ELSEWHERE IS INDEPENDENT OF CLIMATE CHANGE**

our economic, environmental and social situation worse.

Young people should recognise that climate change is an add-on; that problems are more deep-rooted and independent of climate change. Which is where these thinkers (mentioned in my book) come in as they were writing, arguing and reflecting even before climate change. They were saying we have to forge a much more caring, sustainable and equitable path towards economic progress than what the West is doing right now.

**Do you think that the debate between development v environment is reconciled to the fact that the former is the priority?**

I would say that it is a misconception to posit development against environment. It is a juxtaposition very common in the literature, one that is favoured by industrialists and politicians. This is partly out of ignorance because they do not have an understanding of the deep environmental problems that we face and partly because they feel that environmentalists are against development.

But the argument of my book is that India has to adopt a much more environmentally sensitive form of development unlike Europe and North America. This is because it is a country with much higher population densities than

Europe and North America. Moreover, tropical ecologies are much more fragile because of the monsoon than temperate ecologies. And, finally, because unlike Europe and North America, India did not have access to colonies whose

resources it could exploit.

India having to adopt a much more environmentally sensitive form of development takes into account community rights—a combination of social justice and environmental sustainability. And those were the arguments articulated in the 1970s and 1980s by movements such as Chipko, Narmada and others.

If you look at popular non-violent civil disobedience movements, the 1970s and 1980s were the high watermark. But at the same time, there is a great awareness of the environmental crisis among young people today. This includes issues like depletion of groundwater, resources, air pollution and biodiversity, issues

that are connected as well as unconnected with climate change.

So, among young Indians today, there is a greater awareness about the existential crisis that India and humanity face with regards to sustainability. This awareness among young people, which has grown a great deal in the last few decades, does not translate to attention in the mainstream media. It does not translate into politicians having an ear to it and responding to it.

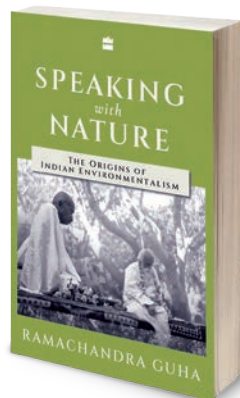
But, I think, the fact of the younger generation having a much greater awareness about the environmental crisis than, say, five generations back is heartening. It will lead to action, activism and will translate into putting proper pressure on the government and the industrial classes who are the main polluters.

Again, in the 1980s, the environmental movement was led by grassroots activists and by journalists. We did not have too many scientists working in this field. In the last 40 years, India has developed a great amount of scientific expertise in this field—in ecology, hydrology, soil science, biodiversity, pollution abatement, urban planning, energy management. If this scientific expertise is harnessed, it can lead us to a sustainable path. It is tragic that these Indian scientists are never consulted. Or if they are consulted, their recommendations are ignored, which is what happened with the Gadgil Committee. And we know what the consequences of the neglect of the Gadgil Committee recommendations were.

**Gandhi's ideas and principles are widely used to define contemporary Indian environmentalism. Can**

## **Gandhi be then projected as a contemporary environmentalist?**

There are three aspects to Gandhi that lend themselves to his being used as an environmental icon. One is the technique of satyagraha. We will protest against unjust, destructive policies but we will do it non-violently. We will not pick up the gun unlike extremists of all hues. That is why you find that from Chipko onwards, many grassroots and livelihood



### **SPEAKING WITH NATURE: THE ORIGINS OF INDIAN ENVIRONMENTALISM**

Ramachandra Guha

Publisher: Fourth Estate India

MRP: ₹799 (Hardcover)

Pages: 440

environmental struggles start their protest on October 2. Take, for instance, Alok Shukla, one of our most admirable grassroots activists who was recently awarded the prestigious Goldman Prize for his work in Chhattisgarh's Hasdeo forest. His organisation started their campaign against destructive mining on October 2, as Gandhi says we will resist injustice but do it non-violently. That is one part of Gandhi's legacy.

The second part is lifestyles. Try and simplify your own lifestyle. As an individual, do not make excessive demands on the earth.

The third aspect is his intuitive understanding. The epigraph to the book quotes Gandhi as saying that, "If India takes to industrialisation after the manner of the west, it will strip the world bare like locusts". He did not develop it further as he was involved in so many other things—freedom struggle, bringing women into public life, campaign against untouchability, fostering Hindu-Muslim harmony.

Gandhi, thus, was not an environmentalist per se. But his instinctive understanding that India needed to adopt a different path towards economic security was taken up by some of his followers. So, my book does not have a chapter on Gandhi. But it has a chapter on two of his most remarkable disciples: The economist J C Kumarappa and the grassroots activist Mirabehn (Madeleine Slade), who worked in the Himalayas. They took Gandhi's philosophical ideas and fleshed them out at a practical level.

I thought about whether I should include a chapter on Gandhi and finally I did not. He is a presence throughout the book. But there are two Gandhians in this book whose ideas, younger readers might find quite appealing.

**This year marks 40 years of the Bhopal Gas Tragedy and 50 years of the Chipko Movement. The Stockholm Convention is now over 50 years old. Each of them is a landmark in the environmental world. If I were to ask you to indicate one such recent event that can qualify as a landmark, what would it be?** It is not one event. But a landmark



event which the government has done nothing about and which I regard as the failure of successive regimes is pollution in Delhi. Here, you are talking about India's capital city. We want to punch above our weight and be recognised as a player in global affairs. India wants a seat in the UN Security Council. And yet we cannot clean up the air of our capital.

Most of the year, the Delhi media will not write about this. In October and November, they will have a few review reports. Alarm will be expressed and then nothing will happen for the rest of the year.

But as you well know, it is a problem present across northern India. The cities of Uttar Pradesh, Madhya Pradesh, Punjab, even across the border in Lahore, Pakistan. I was in Dehradun last year, where I grew up. The air there is as smoky as it is here in Delhi.

I would put it very bluntly: How could the current prime minister spend three terms and do nothing about it? We know there are technical and economic solutions. There are alternatives to stubble burning. Subsidies can be given to farmers to transition away from stubble burning. There are technologies for pollution abatement.

This is scandalous because it is like Bhopal multiplied many times over. Bhopal was a terrible tragedy that occurred on the night of December 2-3, 1984. This is a smaller tragedy but its cumulative effect is greater as it has been occurring every day for three months for the last 20 years. It is striking that no Central government pays proper attention to it. And they just pass the buck to state governments.

**Kerala and Uttarakhand are states at the opposite ends of the country. Both are blessed with natural beauty and have witnessed some of the worst environmental disasters in post-Independent India. Both have also given some of the biggest luminaries to India's environmental hall of fame.**

**Do you see any correlation?**

A very good point. It is Kerala and Uttarakhand. But it is also the Western Ghats and the Himalayas which run through these two states, respectively. Our two great mountain chains are reservoirs of biological diversity and water and home to very rich, cultural aesthetic traditions and forests.

### **THE THINKERS MENTIONED IN MY BOOK WERE WRITING, ARGUING AND REFLECTING EVEN BEFORE CLIMATE CHANGE ON THE NEED TO FORGE A MUCH MORE CARING AND EQUITABLE PATH TO ECONOMIC PROGRESS THAN WHAT THE WEST WAS DOING**

Since they are mountain chains, they are also ecologically fragile. Commercial forestry led to soil erosion and floods. Then you have unregulated road building and mining.

The environmental and social devastation that the policies of post-Independent India have caused have been quite extreme. The Central Indian Forest Belt in Chhattisgarh and Jharkhand would have faced similar levels of brutalisation. But these two areas (Kerala and Uttarakhand) have relatively high levels of education. Kerala has cent per cent literacy. Many scientists, poets and writers have also come from Uttarakhand.

It is true that these two regions have been witness to horrific levels

of environmental degradation which has extracted a massive human cost. Both areas are also particularly vulnerable to climate change: in the Himalayas because of the drying of the glaciers and in the Western Ghats as they run adjacent to the sea. The states have also seen some truly remarkable visionaries who tried to draw the attention of the wider public to the terrible things going on.

**Can India ever have a mainstream Green Party like there are in Europe?**

No. Because we have a first-past-the-post electoral system—the Westminster Model followed by the UK. So we have 543 constituencies

in Parliament. If each constituency has six candidates and one wins 30 per cent of the vote, s/he is elected. Germany and other European countries have proportional representation, where you get representation in Parliament depending on

the proportion of your overall vote, not in every constituency. For instance, the Bharatiya Janata Party and the Congress historically have got big majorities in Parliament of over 300 seats by winning just 35-36 per of the popular vote. In a proportional representation system, they would win only 35 per cent of the seats.

A Green Party can never become a majority party. But it can get enough support from committed people with a deeper understanding of what is going on to attract 7-8 per cent of the vote. And then they get represented in government. 🇮🇳

⊗@down2earthindia

*(For complete interview, log on to [www.downtoearth.org.in](http://www.downtoearth.org.in))*

# Brace for chronic poverty

**I**T IS a conundrum in the face of the century's existential threat, climate change. Warming of the planet has resulted in a climate that is erratic and devastating, particularly for the world's poor whose activities have contributed the least to the global greenhouse gas (GHG) emissions. They are often the direct victims of climate change. Further, this vulnerability, caused by exposure risks, destroys their capacity to move out of poverty. On the other hand, the reality is that, economic growth, which has been instrumental in reducing poverty, is a highly GHG-intensive activity. Developing and poor countries thus, by default, have the right to emit GHGs to ensure their economic progress. Yet this is the most contentious aspect that emerges during the usual rich country-poor country debate over the right to emissions.

Will the poor then be consigned to their fate as usual because we have to curb GHG emissions? Or, more importantly, is poverty eradication at all an emission-intensive proposition?

The World Bank's "The Poverty, Prosperity, and Planet Report 2024" deliberates these issues. First, on the state of poverty, the report says that "global poverty reduction slowed to a near standstill, with 2020-30 set to be a lost decade." Currently, 8.5 per cent of the world's population lives in extreme poverty, with less than US \$2.15 per person per day. The world is not going to meet the goal of reducing extreme poverty to 3 per cent of the global population by 2030. Rather, at the current rate of poverty reduction, it will take "decades" to reach that goal. In 2030, some 7.3 per cent of the global population would still be in extreme poverty.

Globally, in 2021, about 60 per cent of the population was exposed to extreme events like floods, droughts, cyclones or heat

waves. In this context, climate change will further make poverty reduction a daunting task. It has the potential to keep people in a chronic poverty trap. Majority of the world's poor are dependent on biomass-based economies: 66 per cent of the extreme poor rely on agriculture for their livelihoods. This makes them highly vulnerable to climatic shocks. According to the World Bank, "Nearly one in five people is at risk of experiencing welfare losses due to an extreme weather event from which they will struggle to recover." It means, they will endure a severe climate shock in their lifetime that "they will struggle to recover from."

Thus, poverty eradication has assumed new urgency and demands enhanced efforts. This raises the question of whether poverty

**Nearly one in five people is at risk of experiencing welfare losses due to an extreme weather event from which they will struggle to recover**

eradication efforts—additional economic growth—will add on to the GHG emissions. World Bank's research in the latest report cites a few

studies that argue that there would not be much impact. For instance, the report quotes a study and says: "Unsurprisingly, research suggests that additional emissions attributed to moving individuals out of extreme poverty do not counteract climate goals, as emissions of low-income households are minuscule." Another quoted study in the Bank's report says that eradicating extreme poverty will result in 4.7 per cent more emissions than in 2019. "This trade-off is different across countries depending on their levels of poverty and the sources of economic growth and emission levels. Yet it is clear that the foregone reduction in GHG emissions from extreme poverty eradication is minimal," says the report. [DTE](#)

✉ @richiemaha



## Integrated Online and Onsite Training Programme On

# WATER AUDIT: A TOOL TO ACHIEVE WATER NEUTRALITY

As different parts of the world have been facing water scarcity lately, there is a dire need to conserve this most important resource. The industrial sector is the second highest user of water after agriculture. Although the industrial sector accounts for only 10% to 15% of the aggregate annual water demand in developing countries, water is a critical input for process and cooling requirements in a majority of the industries. In this regard, industries are thriving to move towards being water neutral, which refers to balancing the amount of water used with the amount of water replenished or offset.

In order to achieve water neutrality, water audit is a foundational step as it helps organizations understand their water use, identify areas for improvement, and implement measures to balance their water consumption with replenishment efforts.

With this background, Centre for Science and Environment (CSE) is launching an integrated training programme on Water Audit: Tool to Achieve Water Neutrality.

### THE TRAINING PROGRAMME WILL COMPRISE OF TWO PARTS

Basic learning (online platform) and Advanced learning (at our residential campus- AAETI). The course is designed to provide an overall understanding of the concept of water neutrality and water audit process which includes theoretical knowledge via lectures from sector experts, first-hand experience through group exercises, discussions, exposure visit to industries.

#### **PART (A)**

##### **BASIC LEARNING (ONLINE)**

DECEMBER 3-15, 2024

- Introduction to concept of water audit
- Instruments used for water auditing
- Basics of water circuit diagram
- Fundamentals of Cooling towers, and Boilers
- Specific Water Consumption and Benchmarking
- Industrial wastewater management
- Highlights of CGWA notification
- Case studies and assignments

#### **PART (B)**

##### **ADVANCE LEARNING (ONSITE)**

JANUARY 21-24, 2025

- Concept of water positivity and neutrality in industries
- Data analysis, validation and interpretation for water balancing
- Water and wastewater management through smart metering & IoT
- Monitoring and Metering in industries
- Achieving ZLD in Industries
- Sector specific Case Studies
- Advance wastewater treatment technologies with case studies

**NOTE:** The training will be conducted on Moodle Platform where participants will be provided with the reading /audio-visual training material.

The course material be for the duration of 2 hrs per day and live sessions will be on weekends for discussions.

**VENUE:** Anil Agarwal Environment Training Institute (AAETI), Neemli, Rajasthan.

The 4 day's training will have sessions from sector experts, followed by class exercises and industry exposure visit.

**LAST DATE TO APPLY:**  
**DECEMBER 1, 2024**

#### **COURSE FEE**

**Part A: INR 3,500/-** (Indian participant), USD 100/- (Foreign nationals)

**Part A+B: INR 28,000/-** (Indian Participants)

Full waiver on online fees for participants applying for onsite programme

Award of certificate: Certificate of completion will be awarded for both the programme.

#### **WHO CAN APPLY**

Industry professionals, EHS officials, Environmental Consultants, Engineers, Regulators, Environmental laboratories, Academic institutions, Students, Research scholars, and others aspiring to work in the field of water.

#### **FOR ANY QUERY PLEASE CONTACT**

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ANNIVERSARY

16-31 MAY, 2024

# Down To Earth

FORTNIGHTLY ON POLITICS OF DEVELOPMENT

MCELROY

Professor at the

Psychology, Florida

US. He

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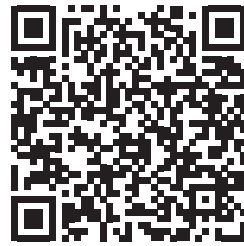
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