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June 2026 Edition

CLIMATE & AGRICULTURE

How The Climate Stress Is Breaking
32 Indian Agriculture

India's Climate
Vulnerability **40**

*A Deep Dive into the Risk Land-
scape and the Road Ahead*

20 The Woman Who Planted
Peace

*Wangari Maathai, the Nobel Prize, and
51 million Trees*



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Editor's *Note*

We are grateful for the continued trust, engagement, and encouragement from our readers and contributors. With every edition, Clear Cut remains committed to bringing evidence, perspective, and clarity to the most pressing development questions of our time.

This month, we turn to climate change—not as a distant threat, but as a lived reality shaping livelihoods, systems, and survival.

Our cover story captures this stark shift. Climate change is no longer a future risk. It is already altering soil, water, and harvest cycles. The crisis is not always dramatic. It unfolds quietly—through declining yields, erratic rainfall, and rising uncertainty for farmers.

The deeper we look, the clearer the pattern becomes. Our deep dive into India's Climate Vulnerability Index shows that no state is untouched. Vulnerability is not just about exposure, but about

who has the capacity to adapt—and who does not.

Across the edition, this question of inequality runs through every section. From grassroots innovations by SELCO that make cooling a matter of dignity, not luxury, to the legacy of leaders like Wangari Maathai and Vimla Bahuguna who remind us that environmental action is deeply human.

This edition does not offer easy answers. But it makes one point clear: climate change is not just an environmental issue. It is an economic issue. A social issue. A question of justice.

Regards,

Parash Kumar

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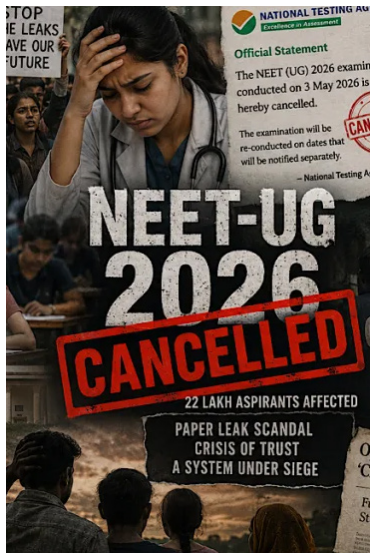
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NEET-UG 2026 Paper Leak Cancellation Triggers National Education Crisis

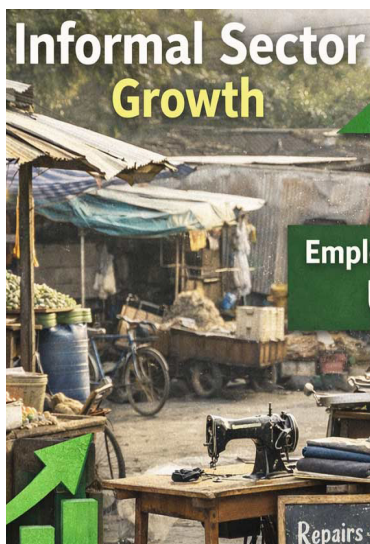
The leakage of the NEET examination paper prior to May 3, 2026, shocked 22.7 lakh young aspirants, most from families who could never afford private medical colleges. They had mobilised every resource available coaching centre, tuition classes, and commercial support systems to prepare. The scandal triggered national outrage and deep introspection about the moral and institutional decline within India's education system.

A government shift to Computer-Based Testing is now promised from 2027. The emotional toll has been severe honest students feel cheated, uncertainty around a re-exam adds anxiety, and coaching centres in Kota, Sikar, and Delhi have reported a surge in student stress and mental health crises. For India's social sector, the crisis has disproportionately hurt first-generation learners, rural aspirants, and young women from lower-income households who bear the heaviest burden of exam system failures.

NITI Aayog Flags Major Gaps in India's School Education System

NITI Aayog's report on India's school education system, released on May 6, 2026, highlighted major gaps in infrastructure, staffing, and learning outcomes across the country, despite improvements in enrolment and access. India's school system includes 14.71 lakh schools serving more than 24.69 crore students. However, 1.19 lakh schools still lack functional electricity, and 98,592 schools have no functional girls' toilets.

Enrolment in government schools has steadily declined from 71% in 2005 to 49.24% in 2024–25. Despite progress, the report notes high dropout rates, weak learning outcomes, teacher shortages, poor amenities, and widening digital inequality, recommending a systemic shift toward competency-based, technology enabled, and inclusive education. The findings are especially alarming for marginalised communities, as the collapse of government school quality disproportionately impacts Dalit, Adivasi, and girls' education across India's most underdeveloped states and districts.



India's Informal Sector Employment Crosses 15 Crore for First Time

Employment in India's unincorporated non-agricultural sector crossed the 150 million mark for the first time in the January–March 2026 quarter, rising 15.51% year-on-year to 151.7 million workers. The NSO bulletin noted this demonstrates healthy labour market growth in a sector that is a major source of employment for skilled and unskilled people across diverse socio-economic backgrounds.

The services segment was the main driver, with service establishment growth at 24.82% and employment in services rising 31.13%. Rising rural entrepreneurship, expanding employment opportunities, growing women's participation, and rapid digital adoption were highlighted as the defining features of the sector's transformation in early 2026. For India's social sector, formalisation of these informal enterprises through digital registration and payment systems expands workers' access to government welfare schemes, credit, and social insurance offering a genuine pathway out of intergenerational poverty across rural India.



India's Mental Health Budget Falls Behind Public Commitments

India's 2026–27 Budget announced a second NIMHANS for North India, trauma centres in district hospitals, and training of allied health professionals including counsellors. While the government's rhetorical commitment to mental health has reached an all-time high, the fiscal commitment remains stuck in a cycle of stagnation and institutional bias. Mental health must be embedded across education, employment, and social welfare not just health budgets and future budgets must move beyond incremental increases to provide greater clarity and integration in allocations.

Civil society groups and mental health professionals have called out the yawning gap between political rhetoric and actual funding levels. With fewer than one psychiatrist per 100,000 people available in most states, inadequate community care infrastructure, and rising distress among students, informal workers, and young women, India's failure to invest meaningfully in mental health threatens to deepen a silent public health emergency that already affects hundreds of millions of citizens.

SBI Workers' Nationwide Strike Highlights Social Protection Failures

The All-India State Bank of India Staff Federation (AISBISF) formally notified management of a two-day nationwide strike scheduled for May 25–26, 2026, raising a 16-point charter of demands across employment and staffing, wages and social protection, and governance and ethical banking practices. A key grievance was the severe recruitment deficit, particularly the non-recruitment of messengerial staff a position that has seen no fresh hiring for 29 years. In the lead-up to the scheduled action, the union mobilized workers through lunchtime demonstrations, press conferences, candle-march processions, and submitted memoranda to Members of Parliament, the Finance Minister, and the Prime Minister.

Although the strike was ultimately deferred following successful last-minute conciliation talks, the agitational call successfully placed a national spotlight on social protection deficits within India's largest public-sector lender.



School Management Committee Guidelines 2026 Launched Nationwide

The Union Minister for Education launched the School Management Committee Guidelines 2026 in New Delhi a comprehensive and unified national framework delineating the roles and responsibilities of SMCs across India. It serves as a consolidated reference for states and union territories to harmonise grassroots school governance. The guidelines aim to empower parents, local elected representatives, and community members to hold schools accountable for learning outcomes, infrastructure maintenance, and child welfare.

Education policy experts have welcomed the move, noting that empowered SMCs represent one of the most cost-effective tools for improving school accountability, especially in rural and tribal areas where teacher absenteeism is chronic and parental participation has historically been weak. The 2026 guidelines come alongside the NITI Aayog school report's urgent call for systemic reform, reinforcing the message that community-level engagement and institutional accountability must work together to rescue India's declining public school system.



India's Rising Inequality Challenges Inclusive Growth Agenda

A May 2026 analysis highlighted rising inequality in India despite strong economic growth, stressing persistent urban-rural disparities, weak informal sector welfare, and significant flaws in existing inequality data. Recent policy shifts including new Labour Codes and the Viksit Bharat Guarantee for Rozgar and Aajeevika Mission (Gramin) Bill, 2025 have sparked intense national debate over the adequacy of rural welfare systems for truly marginalised communities.

Development economists and social sector researchers have consistently warned that India's headline GDP growth numbers mask deeply unequal outcomes across regions, castes, and genders. States like Bihar, Odisha, and Jharkhand continue to show above-average poverty rates and weak human development indicators. Advocates have called for a shift from aggregate economic metrics toward granular welfare outcome measures—nutritional status, school completion rates, infant mortality, and women's labour force participation—as the primary lens for assessing whether India's growth is truly inclusive for every citizen.

New Labour Codes Extend Social Security to India's Gig Workers

Platform aggregators must contribute 1–2% of turnover to a social security fund, with a cap of 5% of payouts. A National Social Security Board will manage welfare for gig and platform workers. Every employer must issue a written appointment letter to all workers on joining. Unorganised workers aged 16 or over must register via Aadhaar to access social security benefits. For the first time in Indian law, a Swiggy delivery partner, an Ola driver, or an Urban Company technician has a legal claim to health insurance, maternity benefit, disability coverage, and old-age protection through a centralised Social Security Fund. Aggregator platforms are required to contribute between 1% and 2% of annual turnover to this fund. Social sector organisations have welcomed the reforms but flagged that effective implementation requires real-time worker registration, state-level rule notifications, and strong enforcement mechanisms to prevent millions of gig workers from continuing to fall through India's social protection net.



India Reaffirms Commitment to Women's, Children's & Adolescent Health

India reaffirmed its strong commitment to women's, children's, and adolescents' health, with the union Health minister highlighting that India is among the first countries to launch a dedicated national programme for adolescents in 2014, reaching young people through facility-based, school-based, and community-based interventions. India has achieved significant reductions in Maternal Mortality Ratio and Infant Mortality Rate at a pace surpassing global trends.

The minister conveyed India's willingness to support broader global health priorities including women, children, and adolescent health and the growing burden of non-communicable diseases. Health equity advocates welcomed the reaffirmation but stressed the need for concrete investments to translate commitments into outcomes, particularly in rural districts where maternal deaths and child malnutrition rates remain unacceptably high. They called for faster deployment of trained health workers, strengthened Anganwadi services, and better integration of adolescent health programmes with school systems to close persistent gaps in India's healthcare delivery across underserved communities.



WHO World Health Statistics 2026 Released India's Progress Highlighted

WHO's World Health Statistics 2026 was released in May 2026, tracking progress towards health-related Sustainable Development Goals. Key findings include a 40% fall in new HIV infections between 2010 and 2024, and a 36% reduction in the number of people needing interventions for Neglected Tropical Diseases globally. However, malaria incidence increased by 8.5% since 2015, raising concerns for high-burden countries including India.

The Universal Health Coverage service index rose from 68 to 71 between 2015 and 2023, but 1.6 billion people globally fell further into poverty due to out-of-pocket health costs. For India, the report provides both encouragement and a warning. While India has made measurable progress in maternal and child health and infectious disease control, the high share of out-of-pocket health expenditure a persistent driver of poverty remains a serious concern demanding urgent acceleration of Ayushman Bharat expansion and community health infrastructure to protect the most vulnerable households.

Early Childhood Development Flagged as Critical Social Priority in May 2026

Early Childhood Development delivers a triple dividend improving child well-being, increasing adult employment earnings, and breaking intergenerational poverty cycles. Proper early nutrition prevents irreversible stunting and wasting, potentially increasing adult earnings by 10–17% according to World Bank data. However, India's ECD governance is fragmented across multiple ministries including Women and Child Development, Health, and Education, causing serious inefficiencies. Infrastructure is also critically deficient, with nearly 12 lakh Anganwadi Centres lacking dedicated pre-primary educators and over-relying on workers burdened with administrative and health duties.

Climate vulnerability, rising heatwaves, and the digital divide further compound disadvantages for early learners in rural areas and low-income urban households. Social sector organisations have called for India to treat early childhood investment as economic infrastructure rather than a welfare concession establishing a dedicated national ECD mission with clear multi-ministry accountability, improved caregiver ratios, and ring-fenced funding to prevent the current fragmentation from robbing India of its demographic dividend



India's Care Economy Crisis: Anganwadi Workers and the Invisible Labour Gap

India's care system is fragmented across multiple ministries including Women and Child Development, Social Justice, and Health, creating major policy design gaps. Current policies treat care as a "women's issue" rather than as economic infrastructure. India faces dangerously high child-to-caregiver ratios often exceeding 1:50 in Anganwadis compared to international standards of 1:10 or 1:15.

Private eldercare costs ₹25,000 to ₹1.5 lakh per month, placing it entirely beyond the reach of most families, while public systems adequately serve less than 1% of India's elderly population. This "motherhood penalty" forces millions of women to exit the workforce due to a lack of shared parenting support. A proposed Parivar Seva Kosh an outcome-based fund within the Ministry of Finance has been suggested to support community-driven, multigenerational care centres. Social sector advocates argue that formally recognising and funding care work is essential for India's gender equality and economic development goals through 2047.

VIMLA BAHUGUNA: Veteran Environmentalist



Dr. Deepti Priya Mehrotra

Vimla Bahuguna (1932-2025), the veteran environmentalist, combined grounded constructive work with far-reaching socio-political activism. From her home in the Himalayas, she built up resistance to deforestation, big dams, destructive mining, commercial forestry, violence and abuse. During the 1970s, along with thousands of local women, she created the Chipko movement, which reverberated across the globe. Today, with lakhs of trees are under threat in Hasdeo, Lakshadweep, Andamans and elsewhere in our country, it is

Vimla Bahuguna turned village women into defenders of the Himalayas—sparking Chipko, challenging destructive development, and inspiring generations of environmental resistance

apt to recall Chipko—and a tiny woman who was one of its tallest leaders.

I first met Vimla Bahuguna in 1988, in Silyara village, Tehri Garhwal. We conversed in her simple home, which also housed the Parvatiya Navajivan Ashram, a grassroots organization she set up in the 1950s, with her husband Sundarlal Bahuguna. She shares: “I was committed to social action. Sundarlal ji agreed to join me. The aim of all our work—on education, health, livelihoods—is to bring about change, to generate new life in the hills.”

Calm, thoughtful, her wiry frame belies the tough activism she is committed to. She describes her daily concerns: “I teach girls, walk from village to village, meet with the women’s collectives, and tackle different problems people bring up.” Sundarlal ji is away, invited to speak about the Chipko movement. I wonder: “Do you not sometimes feel like traveling the world, as he does?” Firmly, she replies: “It is important to travel out, meet people and give them an idea of what we think. But the everyday grassroots work has to carry on. Long years ago I dedicated my life to constructive work in the hills, and I do not like to leave this even for one day.”

But leave she did, time and again, for tasks even more acute, ever more urgent. She was out for weeks during Chipko agitations. And the next time I meet her, in 1992, she is on dharna in Tehri town, protesting the disastrous giant dam being built on the Bhagirathi (Ganga) river.

Her Early Education: the Gandhian Way

Vimla Nautiyal was born in Malideval village, Tehri Garhwal. Her mother, Ratna Devi, opposed practices such as polygamy and ‘kanya vikray’ (sale of girls for marriage). Her father Narain Dutt Nautiyal worked in the Forest Department. They sent her to Lakshmi Ashram, a Gandhian school in Kausani. It was run by Sarala behn, who had taught at Wardha and Vidya Bhavan, Udaipur, before coming to Uttarakhand. She set up Lakshmi Ashram (also called Kasturba Mahila Uthhaan Mandal), with the aim of empowering hill women: the backbone of the hill economy.

At Lakshmi Ashram, Vimla

absorbed the philosophy of ‘Nai Taleem’ (‘New Education’), emphasising self-reliance, bread-labour, and community work. It was (and still is) a residential school with an all-female campus. Girls and women teachers ran the show, taking care of the dairy, vegetable patch, fruit trees, learnt spinning, weaving, cooked and ate nutritious meals. They engaged in community outreach, in the spirit of sarvodaya (welfare of all). After completing her schooling, Vimla began teaching at Lakshmi Ashram.

When Vinoba Bhave’s call for Bhoodan went out, Lakshmi Ashram responded. The entire staff and students walked from village to village, persuading landowners to donate land for the landless. During 1953-55, Vimla went to Bihar, where she managed to get big landowners to gift land to the landless. Vinoba Bhave extolled her extraordinary abilities, writing to Sarla behn: “I have not seen a girl activist like her. She is not just a girl from the hills, she is a devi from the hills”. Already, the young woman was a force to reckon with - focused, fearless. In time, she carved out new paths in the rugged Himalayas.

The Life She Chose

When Vimla Nautiyal received a proposal for marriage from Sundarlal Bahuguna, she rejected it, for she did not want to marry a politician. He was then Secretary of the Uttar Pradesh Congress Party.

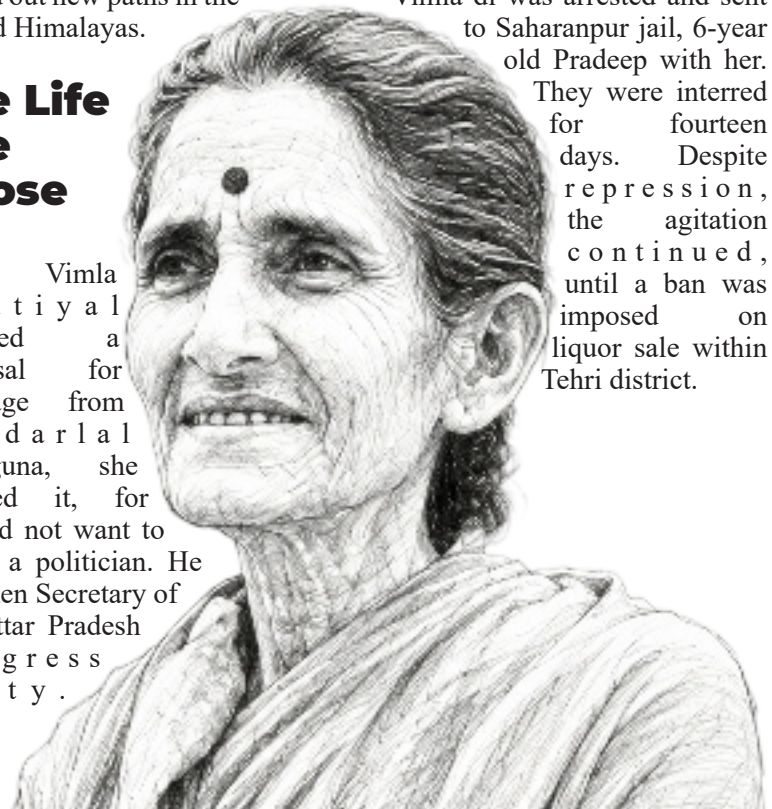
Hailing from Maroda village, Tehri Garhwal, he had met her in Tehri town when she put up a play on Bhoodan. Their parents were keen on the match. Then Vimla set a condition—that he leave party politics and join her in constructive work. He agreed!

Their marriage in 1955 inaugurated a long, fruitful partnership. They moved to Silyara, and built a cottage home, with space for a few young students to reside on-campus. Students came from Silyara and near-by villages, and were educated on the Nai Taleem pattern. Vimla Bahuguna initiated health work, and ignited women’s collectives—Mahila Mangal Dals. Both she and Sundarlal worked on livelihoods, and ecological sustainability. They had three children—Madhu, Rajeev and Pradeep.

During the 1960s, Vimla Bahuguna along with hundreds of women initiated a powerful movement against male alcoholism, and domestic violence. They were peaceful, firm satyagrahis, winning public support, picketing liquor vends, staging dharnas.

Vimla di was arrested and sent to Saharanpur jail, 6-year old Pradeep with her.

They were interred for fourteen days. Despite repression, the agitation continued, until a ban was imposed on liquor sale within Tehri district.



Chipko: to Save Nature and Ourselves

During the 1970s, people's opposition to deforestation came to the fore. Forests, along with subsistence agriculture, are vital to the life and livelihood of local communities. As commercial forestry made forays into the area, their survival came under threat.

In Reni village, Pithoragarh, Gaura Devi led a group of women to surround and embrace trees, preventing their being axed or timber. In Tehri Garhwal, Vimla Bahuguna and women from Mahila Mangal Dals jumped into the fray. They knew, from experience, the power of collective struggle.

Women hugged trees, tied rakhis signifying that trees were their sisters, and mothers. They conducted sit-ins and gheraos, to protect forests. In 1979, Vimla and Sundarlal Bahuguna, Mangsiri Devi, Nanda Devi, Satyeshwari Devi, Bhuri Devi and Jupli Devi, all from Silyara village, set up vigil to save Bandyargarh forest, which was marked for felling. Sundarlal ji was arrested, but protests continued, until the timber contractor finally left the forest.

As agitations raged across Uttarakhand, the government was compelled to set up committees,

carry out surveys, and, in 1981, announced a ban on tree-felling above 1,000 metres. The Appiko movement to save the Western Ghats was directly inspired by Chipko. During 1981-83, Sundarlal ji and others went on padyatra from Kashmir to Kohima, to raise consciousness about preserving Himalayan ecology.

Opposing Tehri Dam: 'Save Ganga, Save Himalayas'

Plans were a foot since the mid-1970s to build a big dam at Tehri, on the Bhagirathi River, source headstream of the Ganga. There was massive opposition to the dam, and in 1977, local people formed Tehri Baandh Virodhi Sangharsh Samiti. In June '78, "...350 women from Khaand village walked with dhol-bajas 20 kilometres to the dam site, which was packed with protesters. Police, Provincial Armed Constabulary and women police were present" (Yugvani newspaper). Over a hundred demonstrators were arrested during ongoing protests. After the government promised to set up a review committee, people dispersed. The movement dwindled.

A decade later, tunnels had been built, coffer dam was under

construction, and seventeen villages evacuated. In 1989, Sundarlal Bahuguna sat on dharna at the dam site. Hundreds of people joined the dharna in Tehri town, amid swirling construction dust. Vimla Bahuguna camped here for months on end. The dam would displace over one lakh people, destroy 123 villages, Tehri town, precious flora and fauna, and risk dangerous flooding. Environmentalists and activists proposed alternatives such as run-of-the-river small dams, which would benefit local people and the plains.

In October 1991, an earthquake in Tehri Garhwal caused massive destruction. The Bahugunas' place in Silyara was severely damaged. Vimla di plunged into rehabilitation work across the area. People kept joining the anti-dam protest. On December 14, 1991, some 5,000 people gathered at the site. Vimla di described: "We marched up to the machines and men. We weren't violent. We simply surrounded the machines and requested the workers to leave." The workers left, work on the dam came to a halt. It was an incredible coup. Batches of local women, men and children came every day, keeping vigil.



This stalemate, a tremulous victory, lasted 76 days. On February 28, 1992, Vimla Bahuguna was arrested from the dam site, with 40 others, including 8-year-old Guddi and 84-year-old Mangsiri Devi. Construction of the dam resumed. In jail, Vimla di undertook a protest fast, over eleven days. All 41 protesters were released, and the agitation carried on.

In April 1992, when I met Vimla di at the dharna site in Tehri, she spoke of the issues at stake. She was in charge of preparing meals for up to 30 persons, with her sister Urmila Bhatt, college student Sunita Chamoli, and children like Guddi, Saraswati, Pushpa, Cooking in makeshift conditions, the small stove had lost its pin, the

pressure
c o o k e r
gasket didn't
fit properly.

Gendered division of labor meant that women were hard-pressed for time. Yet they were fully aware of wider events and issues, engaged in discussion on issues and events, and commanded deep respect.

Sundarlal Bahuguna was on a long fast, which continued for 73 days. In May '92, the government halted dam construction, and set up a review committee. However, this was an eyewash; and soon after the dharna wound up, construction of the dam soon resumed. Activists went to court and won

a stay order, but finally the court ruled that the government could go ahead and complete the dam. Dam construction resumed in 2001.

Undying Relevance

The anti-Tehri dam movement may have failed in its central objective, yet it succeeded in educating people, and shaping public discourse in solidarity with similar struggles such as the Narmada Bachao Andolan. In Uttarakhand, the struggle to 'save Ganga, save the

Himalayas' carries on, helmed by activists like Radha Bhatt, who headed Lakshmi Ashram for decades, and others.

As Vimla and Sundarlal Bahuguna pointed out, within fifty years following independence, the Himalayan foothills lost half their forest cover. The consequences are soil erosion, landslides, dried-up springs and streams, terrible forest fires, floods, avalanches, and subsidence of entire towns and villages. Hundreds of ghost villages exist, emptied out because life there is no longer sustainable.

In her later years, spent in Dehra Dun, Vimla Bahuguna urged young people to oppose environmental destruction and create

sustainable alternatives. "If we hadn't started Chipko," she reminds us, "the mountains would have been hollow." Wisdom such as she embodied might still save us, though we teeter at the edge of global destruction. Ongoing struggles against forest destruction in Hasdeo, bauxite mining in Sijimali Hills, the Chita Andolan in Jharkhand, are imbued with a similar impulse, and thus rekindle hope.



The Climate Challenge to Indian Agriculture: From Disaster Relief to Resilience



Agriculture Under Growing Climate and Disaster Risks



Dr. Satendra Singh

India's agricultural sector is becoming more prone to the dual effects of natural calamities and climate change. In recent years, farmers in various regions of the country have suffered from an increasing frequency of extreme weather events such as unseasonal rain, hailstorms, droughts, floods, cyclones, heat waves, cold waves, and high winds. Such phenomena often cause destruction of crops, loss of agricultural production, deterioration of the quality of soil, disruption of the harvesting process, and increased economic risks for farming communities. It is especially unfortunate when crops get ruined just before harvest after spending months on hard work and financial investments.

Apart from the initial damage and losses associated with specific disasters, there is a new emerging threat in the long run. The unpredictable and erratic

India's agriculture faces rising climate and disaster risks, demanding a shift from reactive relief to resilient, climate-smart systems that secure livelihoods, food security, and sustainable rural

nature of climatic conditions are making traditional agricultural practices and seasonal activities difficult for the farmers. It is becoming difficult to predict when rains will fall, when temperatures will rise, how long the dry spell will last, and how frequently the extreme climatic conditions will occur. The old traditional wisdom associated with farming decisions such as planting and harvesting periods is being made unreliable due to climate change. Events which used to be occasional occurrences have been observed regularly, reflecting the impact of climate change in agriculture. This evolving relationship between climatic changes and disasters is rendering agriculture fragile and calls for an urgent need for climate adaptation practices, disaster management plans, effective early warning systems, and crop insurance, among others.

Expanding Crisis from Food Grains to Horticulture

In addition to the growing crisis experienced by food grains due to climate change, the impact of disaster and climate change is becoming more evident in the horticultural sector, which too faces severe threats from the adverse effects of climate change and environmental degradation. Fruit, vegetable, and plantation crops are facing difficulties due to changing weather conditions including heat waves, unseasonal rains, hailstorms, droughts, pest outbreaks, etc. Compared to field crops, horticultural crops are more vulnerable to slight fluctuations in climatic factors like temperature, rainfall, and humidity.

This is very evident in the case of apple production in the Himalayan states of India like Himachal Pradesh and Jammu & Kashmir. In the production of apples, adequate winter chilling through

cold temperature and snowfall is critical. However, in recent years, there has been a reduction in snowfall and warming trend resulting in decreased chill hours in several places, thereby causing problems like flower development, poor productivity, quality of apples, and forcing apple orchards to move to higher altitude zones. Likewise, climatic stresses are also affecting other fruits like mangoes, citrus fruits, grapes, bananas, and vegetables in India. Late rains when the plants are in the flowering and fruiting phase, temperature fluctuations, strong wind, and pests/diseases are leading to heavy economic losses for farmers.

This increased exposure of the horticultural sector to climate impacts has broader consequences

than just reducing farm incomes. Given the role played by fruits and vegetables in providing nutrition, vitamins, and a variety of foods in our diets, any disturbances to horticulture can have direct impact on nutritional security and food prices.



Disaster and Agricultural Losses around the World

The problems facing agriculture are only a reflection of an extensive global problem that involves disasters. All across the globe, extreme events and disasters are becoming increasingly prevalent in affecting food production and rural livelihoods.

According to Food and Agriculture Organisation the United States (FAO-UN), natural disasters and extreme events caused USD 3.8 trillion worth of crop and livestock production loss globally between 1991 and 2021, averaging USD 123 billion per year. These losses represent a significant share of global agricultural production and highlight the enormous economic burden disasters impose on the agriculture sector.

The occurrence of disasters is increasing by each passing year due to a combination of factors. Natural phenomena such as floods, drought, cyclone, heat waves, fires, and storms are becoming more frequent in their occurrence and affecting wider areas and populations. This, coupled with climate change, environmental damage, urbanization, and socio-economic risks, have led to an increase in disasters, especially affecting agriculture, which depends on weather conditions immensely.

The impact of this loss is more severe on developing countries, especially poor and poorer nations where agriculture provides the main source of livelihood and rural economy. Small farmers, who are generally not financially insured and protected, as well as those who don't have access to proper water infrastructure, insurance and climate-proof agricultural technology, are at maximum

risk. The loss experienced is not confined to food grains alone but also includes fruits and vegetables, livestock, fishery, etc.

These facts are clear evidence of how disaster risk has shifted from being an occasional phenomenon to a regular one which impacts agricultural sustainability, food security, nutrition, employment, and development in general across the globe. This new reality requires an increased emphasis on climate-proof agriculture, disaster risk reduction, forecasting, and sustainable natural resource management strategies.

Agricultural Vulnerability in India

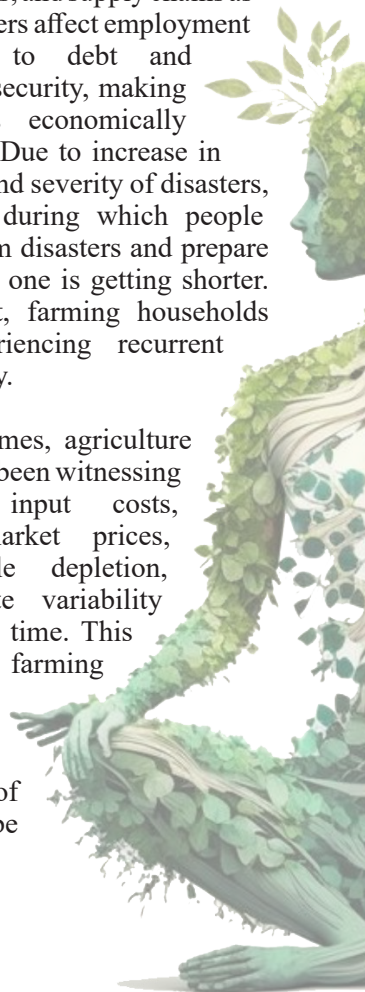
India's agricultural sector is extremely vulnerable to disasters and variations in the climate owing to the high dependence of the sector on the natural resource endowment and monsoon rainfall patterns. It has been estimated that a majority of India's agricultural lands remain rain-fed; hence, the agricultural output from such areas becomes susceptible to changes in climatic parameters. In addition to irregular monsoon and lack of timely rains, long periods of dry spell, floods, tropical storms, hailstorms, and heat waves have become increasingly common in the agricultural zones of India. On the other hand, several river basins and farming zones have simultaneously been experiencing droughts as well as floods.

Furthermore, the vulnerability of Indian agriculture can be

accentuated due to the presence of small and marginal farmers who lack adequate financial capabilities, own small pieces of land, lack irrigation facilities, and do not have much access to insurance policies as well as modern technologies. The current literature and evidence from scientific experiments are indicating that the impact of changing climatic factors on Indian agricultural yields, cropping patterns, irrigation patterns, soil quality, and pest population dynamics has become increasingly common.

Disaster consequences go well beyond mere crop failure. Severe weather events affect livestock, fisheries, irrigation systems, warehouses, transport systems, rural markets, and supply chains as well. Disasters affect employment and lead to debt and financial insecurity, making rural areas economically vulnerable. Due to increase in frequency and severity of disasters, the period during which people recover from disasters and prepare for the next one is getting shorter. As a result, farming households keep experiencing recurrent vulnerability.

In recent times, agriculture in India has been witnessing increased input costs, volatile market prices, water table depletion, and climate variability at the same time. This has made farming in India a difficult task, and a number of issues can be anticipated.



What Does the Future Hold Regarding Climate Change?

The future outlook on climate change is not favourable for the agriculture industry of India, and it may get worse in the coming years. According to scientific analysis conducted by both national and international bodies, South Asia, including India, is likely to face a rise in temperatures and an increase in the frequency and intensity of heatwaves, climate variabilities, and unpredictability in monsoons. These changes are likely to pose great threats to agricultural production, water availability, and rural livelihoods.

The agriculture sector is very sensitive to climate factors, and even minor changes in temperature or rainfalls have a huge effect on

farming processes. Increase in temperature affects a number of different crops, especially wheat that suffers immensely from high temperatures at some important stages of its growth process. Similarly, climate variability causes problems for different food crops, including rice, pulses, and oilseeds due to late

monsoons, leading to sudden

rainfalls, and water scarcity.

The horticultural crops would be subject to greater climatic challenges due to their sensitivity towards changes in temperature and humidity. The alterations in the climate pattern due to variations in winter temperatures, less snowfall, rainfall patterns, and the zones of the climatic belt have influenced the growth of fruits and altered fruit growing pattern in several regions of India. Likewise, other types of crops like vegetable crops, plantation crops, and floriculture would be subjected to climatic changes which affect flower growth and bearing, quality, and marketing.

In addition to this, climate change is also expected to bring about frequent weather disturbances like flood, drought, cyclone, hailstorm, cloudburst, and heat waves. Such climate challenges not only pose threats to the production of crops but also to the infrastructure in rural India and to its water resources and overall food security system. As can be seen from the above, climate change is no more a future problem; it has already impacted agricultural systems and disaster management practices in India.

Threats to Food Security and Nutrition

Climate change and disaster effects on agriculture go beyond the reduction in crop yields; they pose serious threats to food security, nutrition, and the health of the populace. Agriculture continues to be the major provider of food and sources of livelihood in most developing countries

including India. Any disruption in agricultural production is bound to affect the supply chain of food.

Severe weather conditions like droughts, floods, heatwaves, cyclones, and unusual rains can result in reduced crop yield, damage in the storage facilities, disruption in transportation systems, and the unavailability of basic food commodities. The above problems will have a direct impact on the cost of food thereby increasing its expense. This will affect most small and marginal households that use a substantial amount of their budget in purchasing food.

The threat is much greater in horticultural produce because they are sources of vitamins and micronutrients required for proper nutrition.

The reduction in agricultural yields resulting from climate change could lead to low dietary diversity and hence malnutrition problems, especially for children, women, and vulnerable socio-economic groups. The reduction in livestock, fishery, and dairy production due to climatic pressures could exacerbate food insecurity, thereby undermining livelihoods in rural areas.

At the global scale, various organizations have sounded the alarm bells over climate change, indicating that there might be an undoing of the many years' effort towards minimizing world hunger levels and achieving food security. The combination of climatic change, increasing populations, and environmental degradation is putting more strain on our already stretched food system.

Human Side of Climate Distress

In addition to economic costs linked to disasters and climate change, there is another significant human aspect that deserves consideration. Increasingly, farmers from different areas are facing situations where they experience uncertainty, fear, and financial strain due to the changing climate conditions that make forecasts difficult. Farmers' calendars, along with their traditional weather prediction mechanisms, are becoming less reliable than before, making crop management much harder and more challenging.

Farmers usually spend a lot of money, effort, and time planting their fields, using either their savings or borrowing funds. Damage caused to their crops due to unseasonable rain, drought, flooding, hailstones, or heat damage affects not only their ability to make profits but also influences their capacity to repay debts and earn enough for a decent living.

Apart from the initial financial burden, climate-based natural disasters have other far-reaching consequences, such as their effects on social well-being, jobs, migrations, and the general standard of living in rural regions. The delay in assessment and compensation may further complicate the situation for the affected farmers. Although the process of disaster management and compensation is essential in handling the situation, it is not sufficient for addressing climate-related losses.

Another equally important problem faced by the farming community is the sustainability of agriculture practices. With increasing uncertainties in weather patterns, many farmers doubt whether traditional agricultural activities are sustainable. Such concerns highlight the importance

of adopting adaptive practices that will enable farmers to cope with future changes.

Pathway Ahead: From Relief to Resilience

In light of the growing frequency and intensity of disasters and climate risks, there is a dire need to move away from the present approach of relief and compensation, which is largely reactionary in nature, to one that is proactive and focuses on building resilience and reducing risks. Building the resilience of agriculture requires a multi-dimensional approach that involves efforts across policy, institution, technology, and community levels.

Building climate-resilient agriculture has now become imperative in order to reduce vulnerability and promote sustainable agriculture. This would involve crop and livelihood diversification, efficient use of water resources, conservation agriculture, agroforestry, improved soil health, and the use of drought-tolerant and flood-resistant crops as well as salt-tolerant crops. In addition, in the case of horticulture, orchards, scientific crop planning, and proper agro-climatic zoning will assume greater importance.

Improving weather forecasting and early warning mechanisms is also one area that requires attention. There is a need to convert advances in the field of meteorology and climate science into practical weather and climate forecast advisories that would facilitate sowing, irrigation, pest management, and harvesting decisions by farmers.

In terms of policies, the process of reducing disaster risks and adaptation to climate changes needs to be fully incorporated into agricultural and rural development plans. This can be achieved through alignment with international frameworks like the United Nations Office for Disaster Risk Reduction Sendai Framework for Disaster Risk Reduction, which would make the approach more systematic and cohesive in terms of agricultural risk management. Crop insurance and risk financing mechanisms, as well as agricultural research and infrastructure that is adapted to climatic conditions, must also be considered crucial.

It is also necessary to focus on capacity building and institution building. In order to adapt to new conditions, farmers need to have access to scientific information and educational and financial systems.



Transformation through Crisis: Moving Forward

It is evident that the impact of climate change and disasters on agriculture signals the start of an era when agricultural systems will undergo significant transformation. Losses incurred due to the destruction of crops, reduced productivity, scarcity of water resources, altered agro-climatic zones, and uncertainties about the future are all indicative of a transformation in agriculture that the current state of affairs necessitates. This proves that climate change is not just an environmental issue anymore; it is an issue that has developmental and socio-economic implications.

However, in light of the crisis, there are opportunities to re-engineer agricultural systems in

a more sustainable manner. It is clear from the increasing voice emanating from the farmers' communities that apart from the need for relief and compensation, there is an urgent requirement for a paradigm shift that addresses the need for sustainable development of agriculture and makes it more adaptable and resistant to future uncertainties.

The task of ensuring protection of agriculture against the ever-growing effects of climate change and disasters goes beyond agriculture to become an absolute national imperative tied to development, poverty alleviation, environmental protection, and social stability. How resilient the country will make its agriculture

today will define how well it can provide for itself in terms of food and nutrition security in the future and also promote sustainable development. It is clear that delays in acting on this agenda will simply create more vulnerabilities and cost us dearly socially and economically in the future.

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THE WOMAN WHO PLANTED PEACE

WANGARI MAATHAI, THE NOBEL PRIZE, AND 51 MILLION TREES



Tanmay J. Urs

The Child Who Was Told Not to Disturb the Fig Tree

In the hills of Nyeri, in central Kenya, a fig tree grew near the home of a young girl's family. Her grandmother told her it was sacred and must not be disturbed. As a child, she gathered water from springs whose banks were held in place by tree roots. The soil was dark and gave way to seeds easily. She did not know, then, that she was learning something that would take her forty years to fully articulate: that a forest is not merely a collection of trees. It is a community of relationships, a water system, a food system, an economy, and, when it is destroyed, a warning about what happens to the people who depend on it.

Wangari Maathai turned seven seedlings into a global movement—proving that planting trees can fight poverty, protect democracy, and reshape the meaning of peace.

That child was Wangari Muta Maathai, born on April 1, 1940, in Nyeri, Kenya. She would become the first woman in East and Central Africa to earn a doctoral degree, the first African woman to receive the Nobel Peace Prize, and the founder of a grassroots movement that would plant over 51 million trees across Kenya and inspire conservation programmes on five continents. She died on September 25, 2011, from ovarian cancer, in Nairobi. The movement she built outlived her.

The Education That Changed the Argument

Maathai's path from Nyeri to a Nobel podium in Oslo ran through a series of institutional doors that very few African women of her generation were allowed to enter. She earned a scholarship to Mount St. Scholastica College in Atchison, Kansas, where she studied biological sciences, graduating in 1964. She obtained a Master of Science from the University of Pittsburgh in 1966. She returned to Kenya, pursued doctoral studies at the University of Nairobi, and in 1971 became the first woman in East and Central Africa to receive a PhD. She joined the faculty of veterinary anatomy at Nairobi and became the first woman to chair a department there.

Her academic credentials gave her a scientific framework that would define the Green Belt Movement's argument: deforestation was not merely an environmental problem, it was a poverty problem, a public health problem, a women's rights problem, and a governance problem. [Nobel Peace Prize Biography, NobelPrize.org]

She saw, in the degraded hillsides around Nairobi, a direct line between the disappearance of trees, the drying of rivers, the collapse of soil fertility, the hours women spent walking for firewood, the malnourishment of children, and the poverty that trapped communities. She also saw that the solution was something ordinary people, specifically rural women, could implement themselves.

Seven Seedlings on World Environment Day

On June 5, 1977 — World Environment Day, Wangari Maathai planted 7 trees in Nairobi's Kamukunji Park with a small

group of women from the National Council of Women of Kenya. That planting was the founding act of the Green Belt Movement. [Green Belt Movement, greenbeltmovement.org]

The name was literal. The strategy was to plant long rows of trees, green belts, across degraded land, reversing erosion, restoring water tables, and providing communities with firewood, food, and income from the nurseries they built and managed. The women who took part were paid a small amount per seedling that survived, creating an economic incentive tied to a conservation outcome.

Government foresters initially dismissed the approach, arguing that uneducated rural women could not successfully plant and maintain trees. They were wrong. By the time the Green Belt Movement had been running for a decade, 5,000 grassroots nurseries were operating throughout Kenya. [Goldman Environmental Prize, goldmanprize.org]

Since 1977, the Green Belt Movement has planted over 51 million trees in Kenya. More than 30,000 women have been trained in forestry, food processing, beekeeping, and other income-generating skills. [Green Belt Movement Annual Data / Wikipedia, citing GBM reports]

The Political Inconvenience of Planting Trees

What no one anticipated in 1977 was that planting trees would become an act of political resistance. The Green Belt Movement's insistence on planting trees in parks without government permission, was read as a political threat under President

Daniel arap Moi's increasingly authoritarian government.

In 1989, when the government proposed the construction of a 60-storey development in Nairobi's most significant public green space called Uhuru Park, Maathai led as the opposition. She was vilified in parliament, forced to vacate the Green Belt Movement's offices of 10 years with 24 hours' notice. She was publicly dismissed by the government as a troublemaker. International investors, responding to the sustained opposition, withdrew support for the project. However, the park was saved.

In 1992, she was beaten unconscious by police while participating in a hunger strike at Freedom Corner in Uhuru Park, demanding the release of political prisoners. She did not stop. She was jailed, harassed, and periodically placed under house arrest. She continued to plant trees and continued to demand democratic governance.

"Although initially the Green Belt Movement's tree planting activities did not address issues of democracy and peace, it soon became clear that responsible governance of the environment was impossible without democratic space."

[Wangari Maathai, Nobel Prize Lecture, December 10, 2004]

The Nobel Prize That Was a First in Three Ways

On October 8, 2004, the Norwegian Nobel Committee awarded the Nobel Peace Prize to Wangari Maathai ‘for her contribution to sustainable development, democracy and peace.’ She was the first African woman to receive the prize, the first person to receive it primarily for environmental work, and the first laureate whose award explicitly linked ecological conservation to peace and democracy. [Nobel Peace Prize, NobelPrize.org, 2004]

When the announcement reached her in Nairobi, she planted a tree. Within hours of learning of the award, she was in soil. Her Nobel lecture in Oslo described the Green Belt Movement not as an environmental project but as a project in democratic consciousness — teaching communities that they had rights, responsibilities, and the capacity to change their environment.

The UN Environment Programme’s Billion Tree Campaign, which aimed to plant one billion trees globally in 2007, was directly inspired by Maathai’s work and her call to action at the Nobel ceremony. [UNEP Billion Tree Campaign, cited by Yale University Reflections Journal]

After the Nobel, her international platform expanded significantly. She met with heads of state, appeared at the World Economic Forum in Davos, and testified before legislative bodies in Europe and North America. She was elected to the Kenyan Parliament in 2002 and served as Assistant Environment Minister. She founded the Wangari Maathai Institute for Peace and Environmental Studies at the University of Nairobi. She wrote four books: *The Green Belt*

Movement, Unbowed: A Memoir, The Challenge for Africa, and Replenishing the Earth.

The Legacy That Is Measured in Roots and Soil

Wangari Maathai’s death in 2011 did not end the Green Belt Movement. The organisation continues to operate across its four thematic pillars: tree planting and watersheds, gender livelihood and advocacy, climate change, and mainstream advocacy. The Pan African Green Belt Network, established in 1986, extended her model to other African nations. The Wangari Maathai Foundation continues her work in Kenya and internationally.

The connection between environmental restoration and conflict prevention that Maathai articulated is now a documented framework in peace studies and environmental security research. [IPBES / UNEP Post-Conflict Environment Programme]

She is still, 15 years after her death, the most cited African woman in the history of environmental scholarship. The trees she planted are still growing. The rivers they protect are still flowing. The women she trained still run nurseries. The argument she made

that democracy, environmental sustainability, and women’s empowerment are not separate problems with separate solutions, but one problem with one solution, is still being proven right.

Conclusion

The world in 2026 is far more deforested, far more climate-unstable, and far more unequal than the world Wangari Maathai walked into in 1977. It is also, in at least one important way, more prepared: the conceptual vocabulary she spent a lifetime building — linking tree cover to water security to gender equity to democratic governance — is now standard language in climate diplomacy, development economics, and environmental law. She did not live to see it become standard. She did the work that made it possible.

The instruction she left is specific: start where you are, with what you have. Seven seedlings on a patch of Nairobi Park became 51 million trees across a continent. The fig tree her grandmother told her not to disturb became a metaphor that reshaped the Nobel Prize’s definition of peace. Plant the tree, she said. Not as a metaphor. As an instruction. The 51 million trees still growing across Kenya are the most literal proof that she was right.



CLEAN ENERGY, INDIAN STYLE: Why India's Updated NDCs Matter More Than Ever

India's updated **climate commitments** champion a practical **clean-energy** transition—balancing growth, energy security, and sustainability through electrification, innovation, and a Global South approach to **climate action**.

Climate discourse often treats decarbonisation like a universal one-pot recipe: add renewables, subtract fossil fuels, stir in net-zero targets, and serve before 2050. But for countries in the Global South such as India, still navigating poverty alleviation, industrial growth, and reliable energy access simultaneously, the transition cannot be copy-pasted from the Global North template. India is not transitioning from abundance to sustainability; it is trying to maintain a proper balance between growth and climate action to meet the twin objectives of addressing energy poverty alongside environmental sustainability.

That distinction is crucial and is perhaps most visible in India's recently submitted Nationally Determined Contributions (NDCs) to the United Nations Framework Convention on Climate Change (UNFCCC). The revised climate commitments represent one of the most pragmatic and forward-



Akanksha Jain



Debajit Palit

looking climate strategies among major economies, as they attempt to meet the climate goal while also grounded enough to withstand reality.

India now aims to reduce the emission intensity of its GDP by 47% from 2005 levels by 2035, building upon the nearly 36% reduction already achieved by 2020. The country is also targeting 60% non-fossil installed power capacity by 2035, after already crossing the 50% mark much ahead of schedule. Alongside this, India intends to create an additional carbon sink of 3.5-4 billion tonnes through forests and tree cover. These headline numbers reflect a systems-based approach rather than an ideological climate policymaking - an approach that we at Chintan Research Foundation have been attempting to advance in framing the debate for the Global South by asking not merely "What is green?" but also "What works, where, and for whom?"

At the heart of this approach is the “electrons-first” strategy. The motto for Global South, should be to electrify wherever possible and use molecules-based fuels only where necessary. Moreover, this clear distinction is advantageous not only from an economic and climate perspective but also rooted in thermodynamic efficiency. Direct electrification through electric vehicles, railways, heat pumps, electric furnace and electric cooking can achieve high end-use efficiencies of 70% to more than 90%. By contrast, use of electricity to produce molecules such as hydrogen, or using fossil molecules involves substantial losses across electrolysis, storage, transportation, and reconversion, often pushing overall efficiency below 40%.

This is why India’s clean energy transition should increasingly centre around expanding renewable energy-based electricity systems to achieve its both green and growth ambition - and India is on the right path. Cross-country empirical analyses show that electricity availability functions as a necessary precondition for faster economic growth.

In India, solar and wind are now among the cheapest sources of electricity. Massive investments are underway in transmission corridors, battery storage, and long-duration storage systems. Indian Railways is nearing full electrification. Electric mobility adoption is accelerating. Distributed solar for agriculture is growing. These are not isolated initiatives; they are part of a coherent architecture aimed at increasing electricity’s role in final energy consumption.

And importantly, this approach is environmentally sensible beyond carbon metrics alone. Direct electrification reduces local air pollution, lowers dependence on imported fossil fuels thereby increasing energy security, and avoids locking countries into energy-intensive fuel conversion chains. In urban India, where air quality remains a public health emergency, electrification ensures there are no tailpipe emissions and, therefore, is a climate intervention and a health imperative packaged in one.

At the same time, we should also recognise that not every sector can be electrified efficiently, and

that molecules will matter for hard-to-abate sectors and long-haul transportation, such as steelmaking, fertiliser production, long-haul freight, shipping, and aviation. This is where green hydrogen, advanced biofuels, and synthetic fuels will come into play as targeted solutions. For instance, using green hydrogen in passenger vehicles would require significantly more electricity per kilometre than battery-electric alternatives. But in steelmaking, especially through direct reduced iron pathways, hydrogen offers one of the few viable decarbonisation routes. Similarly, biofuels produced from agricultural residues can help decarbonise aviation and heavy transport while also addressing challenges of crop residue burning and rural waste management. This layered strategy can reflect an important maturity in India’s climate thinking. The transition should move beyond a battle between technologies to an exercise in better optimisation.



Of course, none of this is effortless. Biomass feedstock aggregation remains difficult. Storage and grid integration have challenges. Financing gaps persist. Technology access and costs remain volatile. And here the most underappreciated aspect of India's updated NDCs is that they acknowledge these constraints rather than pretending they do not exist. That realism is precisely what makes the India's commitments credible.

This becomes even more significant when viewed against the backdrop of recent global disruptions. The COVID-19 pandemic, the Russia-Ukraine conflict, and ongoing instability in West Asia have collectively exposed the fragility of global energy systems. For India, which imports nearly 85% of its crude oil and around half

of its natural gas requirements, such shocks translate directly into inflationary pressures, fiscal stress, and energy insecurity. Yet despite these pressures, India has not diluted its climate commitments. If anything, it has strengthened them.

This stands in contrast to several developed economies that are deciding to reopen their coal plants, delayed phase-out commitments, struggled to meet their own climate finance promises or have even backed out completely. India's approach has instead focused on balancing four competing priorities simultaneously: expanding energy access, ensuring affordability, maintaining energy security, and reducing carbon emissions. And perhaps that is the broader lesson India offers the world this World Environment Day. In developing

countries, environmentalism and energy transitions need to be carefully balanced and sequenced. Electrification should happen first where it delivers the greatest gains. Alternatively, molecules should be deployed where direct electrification is unviable. Climate action must reduce vulnerability, not deepen it. India's updated NDCs represent a transition strategy that is designed to endure.

About Author:

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The Great Derangement

A Staple Climate Coursebook



Amitav Ghosh never set out to write a polemic with *The Great Derangement*. The book started life as the Berlin Family Lectures at the University of Chicago, and you can still feel that origin in its final form: it's restless, essayistic, and willing to chase an argument wherever it leads. Ghosh roams across literary criticism, history, postcolonial theory, and political philosophy, but he never drops his central question. It's a simple claim, almost unsettling in its clarity: our culture and politics aren't

"How do you lose a word? Does it vanish into your memory, like an old toy in a cupboard, and lie hidden in the cobwebs and dust, waiting to be cleaned out or rediscovered?" - Amitav Ghosh

just failing to grapple with climate change but they're fundamentally incapable of doing so. This incapacity isn't some communication glitch or a matter of weak political will. It's baked into the very ways modern societies think and tell stories about themselves.

That's a big assertion. Ghosh builds his case methodically, but with a confidence that makes the book short as it is, worth reading slowly, maybe more than once.

Stories: The Failure of the Novel

The first section, "Stories," is probably the most innovative and provocative part of the book. Ghosh begins by reflecting on his own difficulty, as a novelist, in weaving climate change into serious literary fiction. This isn't just a technical hurdle. The problem, he argues, is structural, climate change defies the core conventions of the modern novel.

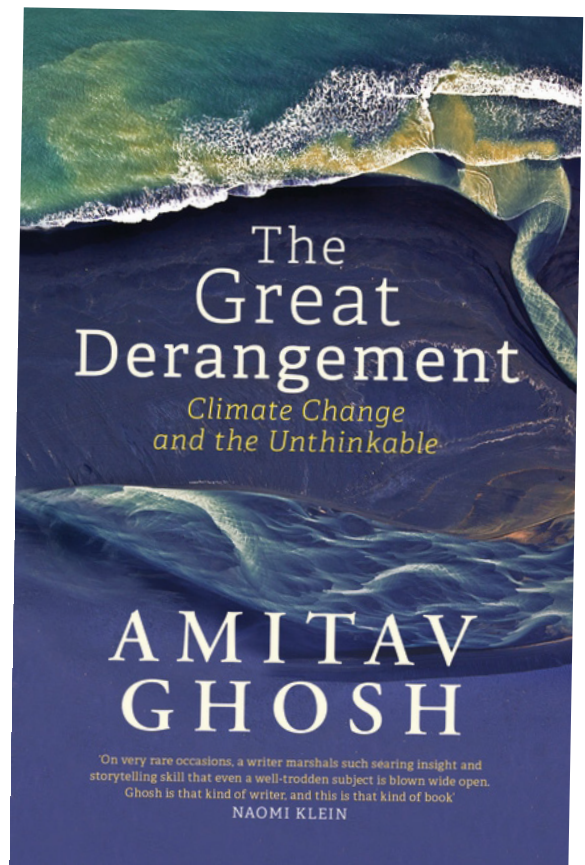
Since the eighteenth century, the "serious" Anglo-American novel has focused on the individual on their consciousness, moral growth, and relationships, played out in a familiar, believable world. The novel prefers the probable, the plausible, and what Ghosh calls "the regularity of bourgeois life." It's about events that could, in principle, happen to someone like us, in a life we recognize.

Climate change upends all this. It unfolds on timescales and spatial scales that dwarf human experience. Its most vivid signs such as floods, cyclones, wildfires are rare and extreme, unlikely in any single life but inevitable in aggregate. For the novel, these events fall into the territory of melodrama,

not realism. Even when novels do feature climate disasters, they get shunted into genre fiction, labeled dystopian or thriller not serious art. The traditional literary novel so in love with interiority and realism simply can't take in the scale or improbability of the planetary crisis without scrambling its basic form.

Ghosh isn't just describing a literary phenomenon; he's diagnosing a problem. He points out how the novel and carbon capitalism grew together. The realism of the 19th- and 20th-century novel reflects a worldview where nature is a stable backdrop, the individual stands at the center, and the present flows neatly into the future. But the Anthropocene, this era of

planetary disruption destroys those assumptions. The cultural "derangement" Ghosh writes about is a collective failure of the imagination, and that kind of failure keeps us from acting.



Politics: The Inadequacy of Liberal Rationalism

The third section, “Politics,” is both the most pessimistic and the boldest. Here, Ghosh goes after the core frameworks of liberal democracy, cost-benefit analysis, policy tweaks, rational negotiations between self-interested states and calls them structurally inadequate for the climate crisis.

These approaches assume a normal timeline, familiar costs and benefits, and a cast of actors who can speak and be heard. Climate change blows apart these assumptions. Its timescales outstrip election cycles. Its impacts are scattered across distant generations and nonhuman life, none of whom get a vote. Standard economic tools just erase these costs, or discount them into virtual oblivion.

Ghosh’s most striking move is to argue that secular liberal rationalism might not hold the answers we need. Instead, he points to social movements and religious traditions such as *Laudato Si* (Pope Francis’s 2015 encyclical on ecology and human responsibility) from the Catholic Church, Indigenous frameworks that tie ecology and cosmology together, mass movements that win change through passion and moral force rather than technocratic policy as these, he suggests, might offer models for real political mobilization. It’s a challenge to

conventional wisdom, and Ghosh doesn’t fully map out what would follow, but his intellectual honesty is bracing. He’s not prescribing solutions; he’s diagnosing the structural obstacles in our current politics.

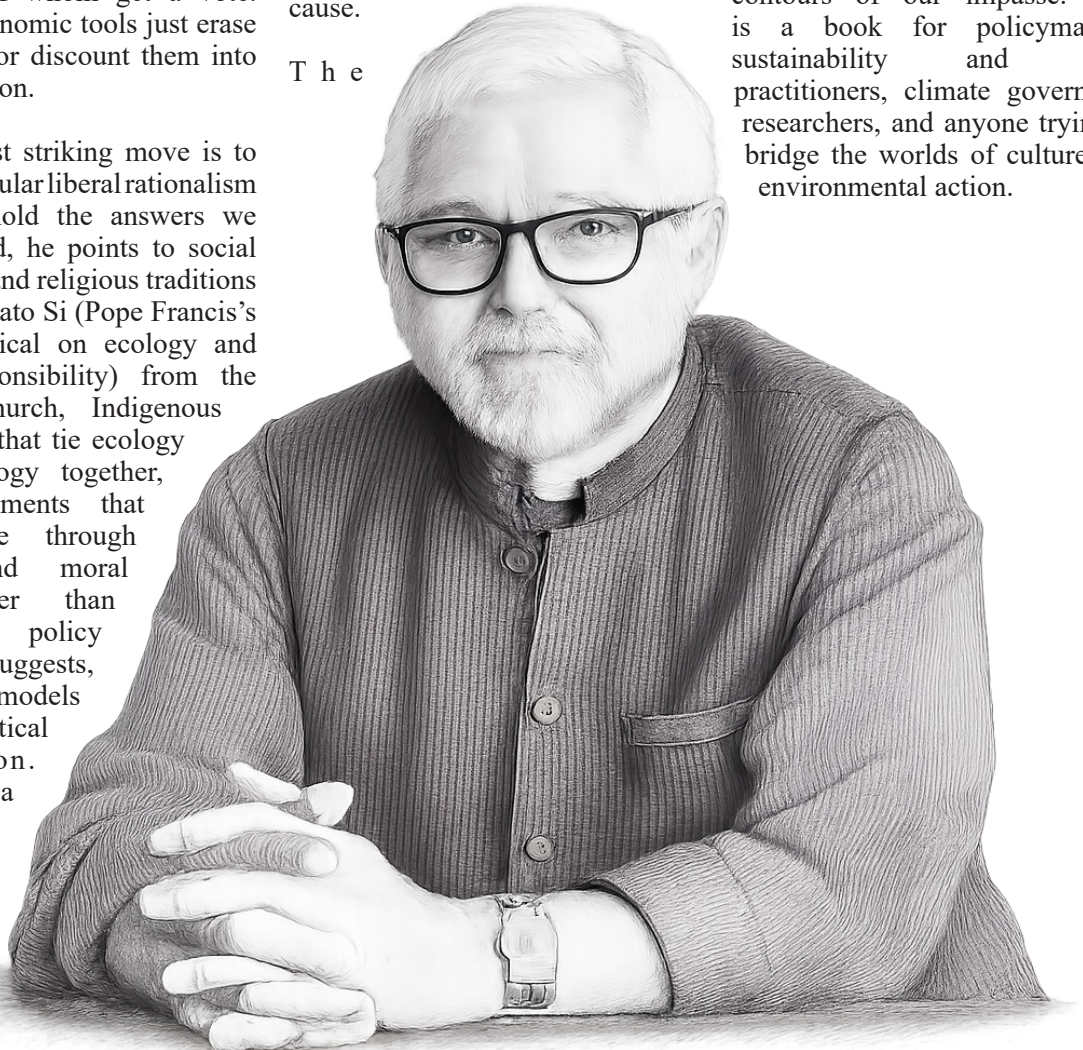
Assessment

Nearly a decade after publication, *The Great Derangement* feels less like a provocation than an analysis that time keeps vindicating. The literary novel still shies away from climate change or when it addresses it, the work gets slotted as genre. International agreements, like the Paris deal, have yet to generate emissions reductions at the scale promised. And the injustices Ghosh details have only grown more visible as the world’s most vulnerable bear the brunt of disasters they didn’t cause.

The

limits don’t undermine the achievement. The *Great Derangement* stands as the clearest, most intellectually serious account of why our cultural and political systems keep missing the scale and urgency of climate change. The problem, Ghosh insists, isn’t just one of information or will. It’s woven into how we think, how we write, and how we govern. A decade later, this insight hasn’t been dislodged, it’s been confirmed over and over.

If you work on environment and climate whether in policy, advocacy, corporate sustainability, or research, this is essential reading. It won’t hand you solutions, but it will help you understand why the standard approaches fall short, and why a deeper reimagining is overdue. Ghosh’s sharp and graceful analysis draws the true contours of our impasse. This is a book for policymakers, sustainability and ESG practitioners, climate governance researchers, and anyone trying to bridge the worlds of culture and environmental action.



The Star Who Stayed: Dia Mirza

and the Quiet Architecture of Real Environmental Advocacy

A Choice That Did Not Make Headlines

In the early 2010s, when Dia Mirza was at a point where most actors would be intensifying their film commitments, she made a different calculation. The roles did not diminish in quality. What changed was where her time and public capital went. She began to speak about plastic pollution, about tree cover, about the relationship between urban development and ecological collapse. At first, this was the kind of celebrity environmentalism that is easy to be sceptical about. The photo opportunity, the hashtag, the gesture that substitutes for commitment. It did not remain that. It became something considerably more structured and harder to dismiss.

Dia Mirza Handrich, born on December 9, 1981, in Hyderabad, first entered public life when she won the Miss Asia Pacific International title in 2000. She went on to a successful Bollywood career with films including *Rehna Hai Terre Dil Mein*, *Lage Raho Munna Bhai*, and *Sanju*. But alongside the filmography, she was building a parallel record. This one, in fact, eventually drew the attention of the United Nations and redefined what the term ‘celebrity advocate’ can mean when it is taken seriously.

The Mandate She Was Given

In 2017, Dia Mirza was appointed UNEP Goodwill Ambassador for India by the United Nations Environment Programme, making her



Tanmay J. Urs

the formal international face of environmental advocacy in one of the world’s most populous and ecologically complex nations. [UNEP, unep.org/people/dia-mirza]

The appointment was not ceremonial. Her mandate covered priority areas including clean air, clean seas, wildlife protection, and climate action. These were the 4 key areas where India’s policy and public consciousness gaps were substantial and consequential. In 2020, her term was extended. UNEP’s Regional Director for Asia and the Pacific, Dechen Tsering, explicitly referred to her significant contributions to campaigns including World Environment Day, Beat Plastic Pollution, and Circular Fashion.

Mirza has also served as an SDG Advocate, appointed directly by the United Nations Secretary-General to accelerate progress on the Sustainable Development Goals — placing her in a cohort that includes heads of state, economists, and global business leaders. [UN DESA / UN Office for Partnerships, un.org]

India ranks among the world’s most vulnerable nations to climate change, with over 600 million people facing high water stress, 22 of the world’s 30 most polluted cities, and annual economic losses from environmental degradation estimated in the hundreds of billions. [IQAir 2024 / World Bank 2025]



Beyond The Photographs

There is a version of celebrity advocacy that involves showing up for the photograph and returning to the schedule. Mirza's is not that version. She has spoken at COP climate summits, appeared before corporate sustainability forums, and campaigned against single-use plastic at a time when doing so in India carried more friction than applause. She married in 2021 in a ceremony she publicly described as zero-waste, with no single-use plastic and sustainable sourcing throughout. This was a personal decision she explicitly connected to her public platform.

Her campaigns have targeted specific behavioural and policy shifts, not diffuse aspirations. The Beat Plastic Pollution campaign she fronted for UNEP India was a direct call to government and industry to replace single-use plastic infrastructure. Her advocacy on clean air has pushed for recognition that urban India's air quality crisis is not merely an inconvenience but a public health emergency with measurable mortality consequences.

India's Swachh Bharat Mission has made documented progress in sanitation, but UNEP data indicates that plastic pollution remains a severe and growing problem, with India generating an estimated 9.46 million metric tonnes of plastic waste annually, of which only a fraction is formally recycled. [UNEP Global Plastics Outlook 2023 / MoEFCC]

The Biodiversity Dimension

Mirza has been particularly consistent on wildlife and biodiversity. It is an area of advocacy that is significantly less photogenic

than clean oceans and significantly more politically complex. She has raised the cause of individual species facing extinction, criticised policy decisions that permit the commercial exploitation of protected areas, and connected wildlife preservation to broader ecological stability in ways that require explanation rather than mere emotion.

She has planted trees in degraded forest areas, participated in wildlife rescue operations, and used her social media platforms, which reach tens of millions of followers, to amplify verified data on biodiversity loss rather than simply circulate aesthetically appealing nature content.

Global biodiversity loss is accelerating, with approximately one million species currently threatened with extinction according to the IPBES 2019 Global Assessment. India, one of 17 'megadiverse' countries globally, faces documented threats to 14% of its assessed plant and vertebrate species. [IPBES 2019 Global Biodiversity Assessment / MoEFCC]

The Limits and the Honest Account

It is important to be honest about what celebrity advocacy can and cannot do. It cannot write legislation. It cannot compel corporate behaviour. And it risks being discredited if the public figure's personal consumption patterns diverge visibly from their stated commitments. Mirza has acknowledged this tension openly. She has described her own journey toward more sustainable

personal choices as imperfect and ongoing rather than achieved.

What celebrity advocacy can do is shift the terms of what is socially legible. When a person with 10 million Instagram followers plants a tree and explains what soil microbiome health has to do with agricultural resilience, that explanation reaches demographics that a government campaign would not. When she refuses to endorse products that contradict her environmental commitments, that refusal signals to industry that the green consumer market is not infinitely malleable.



The Vision: From Visibility to Velocity

India stands at a critical environmental inflection point. Its Nationally Determined Contributions under the Paris Agreement commit it to 500 GW of non-fossil energy capacity by 2030 and net-zero by 2070. Against this backdrop, environmental advocacy that reaches a general public audience is not peripheral to the policy process. It is part of the political economy that makes ambitious policy possible.

Dia Mirza's role in that ecosystem is legitimate and documented. She has held a formal UN mandate for a decade. She has appeared in institutional contexts such as at UNFCCC events, at government forums, before corporate sustainability councils. She has not

been merely decorative. The question for the next phase of her advocacy is whether the visibility she commands can be translated into the harder, slower work of institutional change. This meaning for her to push enforceable corporate sustainability standards in the Indian entertainment industry. Added to that, advocating for green building codes in Bollywood's massive physical production footprint, or connecting the celebrity platform to the funding pipelines that grassroots environmental organisations in India desperately need.

The star who stayed is not enough. India needs the advocate who accelerates. The platform exists. The mandate is real. The urgency is undeniable. The question is whether the next decade matches the scale of the crisis with the scale of the commitment.





Climate &



Agriculture

CLIMATE & A

How The Climate Stress Is Bre

Two Truths, One Morning

At 9:47 AM on 19 May 2026, Sudhir Ahluwalia posted a thread on X that would be reshared thousands of times before noon. “The most important climate risks,” he said, “are often not singular catastrophic events, but the gradual weakening of interconnected systems that societies depend upon every day.” At about the same hour, a farmer in a district of Haryana without a verified account or trending hashtag was examining his pale, compacted soil, worn out after yet another season of inputs it was unable to absorb effectively, and

As rising heat, erratic monsoons, and soil collapse reshape Indian farming, this ground-level investigation reveals how climate stress is turning agriculture into a survival struggle for millions.

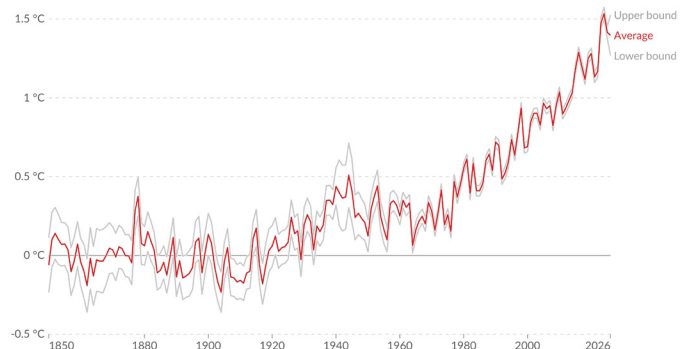
performing the same computation he does every October. Not because he doesn’t know what burning does. Because he has a few acres, ten days, no machine, and no other option. Two facts that arrive simultaneously from opposite ends of the same country. The X explained the crisis in language that people could easily share, quote, and circulate. The farmer was living it in silence that travels nowhere. Between those two realities—the viral and the invisible, the data and the dirt—lies the full story of what climate change is doing to Indian agriculture in 2026.

The Crisis That Is No Longer Coming

The story expands quickly when you step into a field of a farmer.

Temperature change relative to the pre-industrial period, World

Temperature anomaly, measured as the difference between the average land-sea surface temperature in a given year and the 1861-1890 mean, in degrees Celsius.



Data source: Met Office Hadley Centre - HadCRUT5 (2026)

OurWorldinData.org/co2-and-greenhouse-gas-emissions | CC BY
Note: The period 1861-1890 is used as the baseline to measure temperature changes relative to pre-industrial times, as recommended by the source.

Source: Our World in Data

Sudhir Ahluwalia @sudhirahluwalia · May 19
Climate Change Is Increasing Pressure on Global Food and Water Systems

Climate change is often discussed through temperature records and extreme weather events. Yet one of its most immediate and destabilizing consequences is the growing pressure on food and water systems.

The challenge is systemic.

Climate disruption acts as a stress multiplier, amplifying existing vulnerabilities across agriculture, water availability, supply chains, and human livelihoods. The issue is therefore not limited to isolated disasters, but to the interaction of interconnected systems under increasing environmental stress.

Agriculture is already showing measurable sensitivity to warming trends.

Research increasingly suggests that even a 1°C rise in global temperatures may reduce yields of major staple crops, including wheat, maize, rice, and soybeans. This is especially significant given that nearly 2.5 billion people worldwide depend directly on agriculture for their livelihoods.

Image Source: @sudhirahluwalia on Twitter

AGRICULTURE

Breaking Indian Agriculture



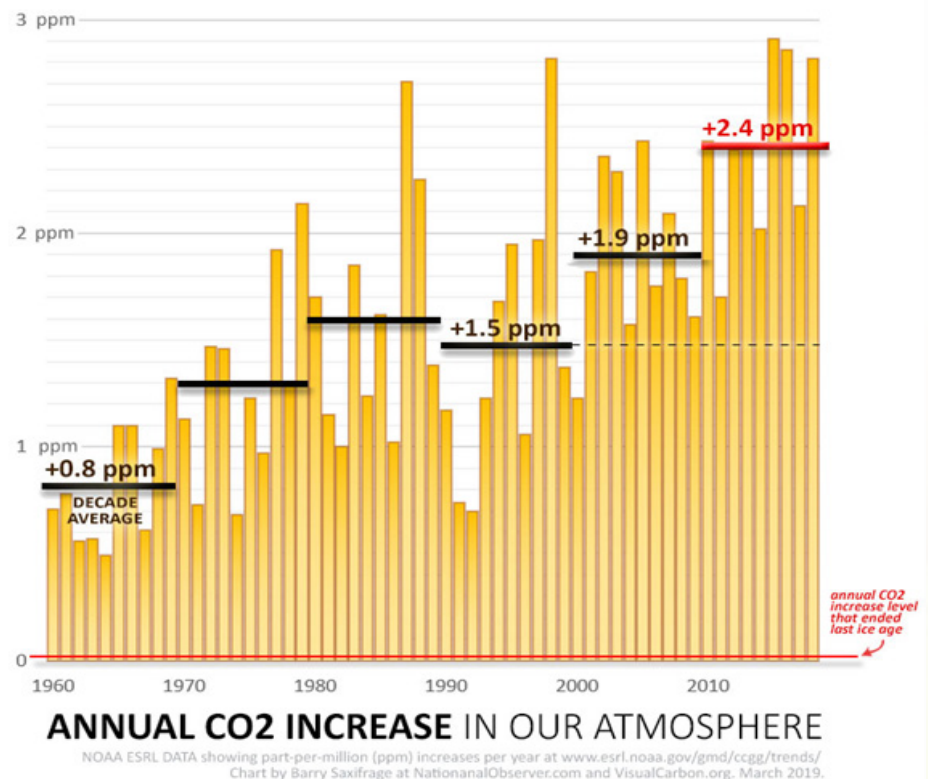
Muskan Pal

According to the WMO State of the Global Climate 2025 report, the global mean temperature in 2025 was about 1.43°C higher than the pre-industrial average between 1850 and 1900.

Carbon dioxide concentrations also continued to rise dramatically, with 2025 being among the most significant annual rises on record. Climate change does not pose a future hazard. It is a present condition.

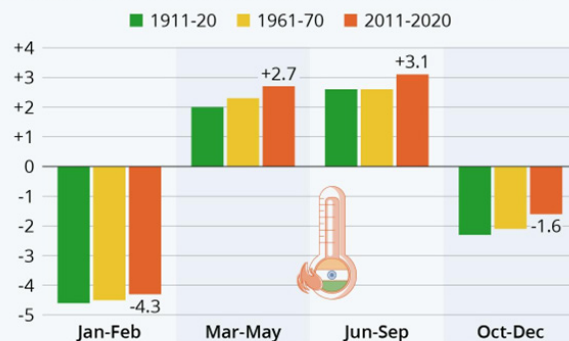
Annual and decade average rate of atmospheric CO₂ increase, via Visual Carbon

The repercussions of this warming are no longer speculative; they are being measured on a district, season, and harvest basis. India is warming faster than the global average, with rising surface temperatures over the mainland and nearby waters, exacerbating extremes on land and at sea. Changing rainfall patterns and more frequent extreme precipitation are drying off areas of the Indo-Gangetic Plains while flooding northwest India, regions whose agricultural output feeds the country.



How India Is Heating Up

Average divergence from mean temperature at the beginning of the last century in India, by decade (in °C)



Average of mean temperature 1901-10 used as baseline
Sources: India Meteorological Department,
Ministry of Earth Sciences via MOSPI EnvStats India report



Image Source: Statista



The average temperature in India increased by about 0.9°C between the early twentieth-century baseline and the 2015-2024 averages.

This transition has already been widely experienced. According to the Yale Program on Climate Change Communication and CVoter survey, which was conducted among 10,751 Indians between December 2024 and

February 2025, the majority of respondents reported personally experiencing severe heat waves, agricultural pests and diseases, droughts and water shortages, and severe air pollution in the previous year. These aren't faraway abstractions. These are recent recollections.

We've spent two decades debating whether climate change is real. That

dispute is over, and we wasted time having it. What stands out about the Yale survey figure—71% of Indians reported severe heat waves in the recent year—is that it is not a projection. That's a recollection. We no longer discuss what might happen to our grandchildren. We are discussing what happened to our neighbours last summer.



Where Climate Change Hits Hardest

The numbers just validate what the ground has been reporting. According to groundwater evaluations referenced in national and regional reporting, Punjab draws around 35 billion cubic meters of groundwater each year, compared to a natural recharge of approximately 21 billion cubic meters, resulting in an annual shortfall of approximately 14 billion cubic meters. More than 80% of Punjab's administrative blocks have been classed as overexploited. Climate change does not occur in a single event. It arrives as a stress multiplier, exacerbating existing vulnerabilities in water, health, land, and livelihoods. [CGWB]

According to CSE's Climate India 2025 study, India witnessed extreme weather on virtually every day in the first nine months of 2025, with certain states and union territories having the most extreme-weather days since 2022. Himachal Pradesh saw harsh weather on over 80% of the 273 days measured during that time period, while Madhya Pradesh, Andhra Pradesh, and Jharkhand saw particularly high fatality rates from extreme weather events.

According to the Lancet Countdown and FAO-WMO reports on heat and agriculture, heat-related mortality has increased dramatically around the world, and agricultural workers are particularly vulnerable because their job frequently takes place outside during the hottest portion of the day. Climate-economy studies predict huge GDP losses by the end of the century, with millions of people forced back into poverty unless adaptation and resilience improve swiftly.

A water crisis, an extreme weather crisis, a public health crisis, and an agricultural crisis are not distinct emergencies. They represent a single emergency conveyed through four mechanisms. The figure of extreme weather on practically every day in the first nine months of 2025 should put an end to the debate over whether India has enough time to move slowly.

Climate change, however, is most obvious in the field rather than in reports, charts, or national averages. Agriculture is where rising temperatures, deteriorating rainfall patterns, water scarcity, and economic stress all collide. The crisis ceases to be statistically significant there. It becomes physical: a delayed sowing season, a diminished harvest, soil that no longer responds as it once did, and families compelled to plan for survival one season at a time.

where the abstract catastrophe becomes tangible, quantifiable, and personal. According to India's agriculture ministry, the sector accounts for approximately 17-18% of GDP and employs nearly half of the population. It is also one of the most climate-sensitive industries in the economy.

According to the agronomic and climate-agriculture estimates, by 2025, India's mean temperatures will have risen by 1 to 1.5°C above pre-industrial levels. Heat stress during important crop growth phases, particularly grain filling in cereals such as wheat and rice, affects



How Climate Change Hits the Field

In the field, climate change becomes a season rather than an argument. Agriculture is

grain formation and yields. Wheat yields can reduce dramatically in hot weather above 35°C if farmers do not have access to adaptive techniques. Rising temperatures also hasten crop maturation, resulting in lower grain weight, oil content, and nutritional value.

Climate reporting on the Indian monsoon highlights how irregular and delayed monsoon patterns are upsetting crop calendars that have been in place for generations. Warming during the monsoon season is extremely dangerous because it disrupts the monsoon system, causing floods in some areas and drought in others—often simultaneously. When the monsoon is delayed by two weeks, the kharif sowing season fails. Standing crops dry out when it withdraws too early.

During the October–November burning season, stubble burning in Punjab and Haryana generates about 30–40 million tonnes of CO₂-equivalent emissions, according to estimations based on SAFAR and IITM. Additionally, it eliminates the microbial life and organic debris that maintain the fertility of the soil. This has exacerbated the gradual deterioration of some of India’s most productive land over decades.

At least 9.47 million hectares of cropped land in India were impacted by extreme weather in 2025, up from 1.84 million hectares in 2022, according to the CSE’s Climate India 2025 report. Income loss is caused by crop

failures. Debt is caused by income loss. Distress is caused by debt. Weather-related crop losses are a significant contributor to mental distress and suicide risk in rural India, according to evidence from psychiatric and rural health studies. Persistent agricultural misery also drives migration into cities and puts more strain on urban services.

The statistic that keeps coming to mind is the four-fold rise in damaged

agriculture from 1.84 million to 9.47 million hectares between 2022 and 2025. That isn’t a slow decline. Acceleration is that. Despite this, India’s governmental response to agricultural climate damage remains mostly reactive, with insurance payouts following the loss rather than infrastructure investment prior to it.

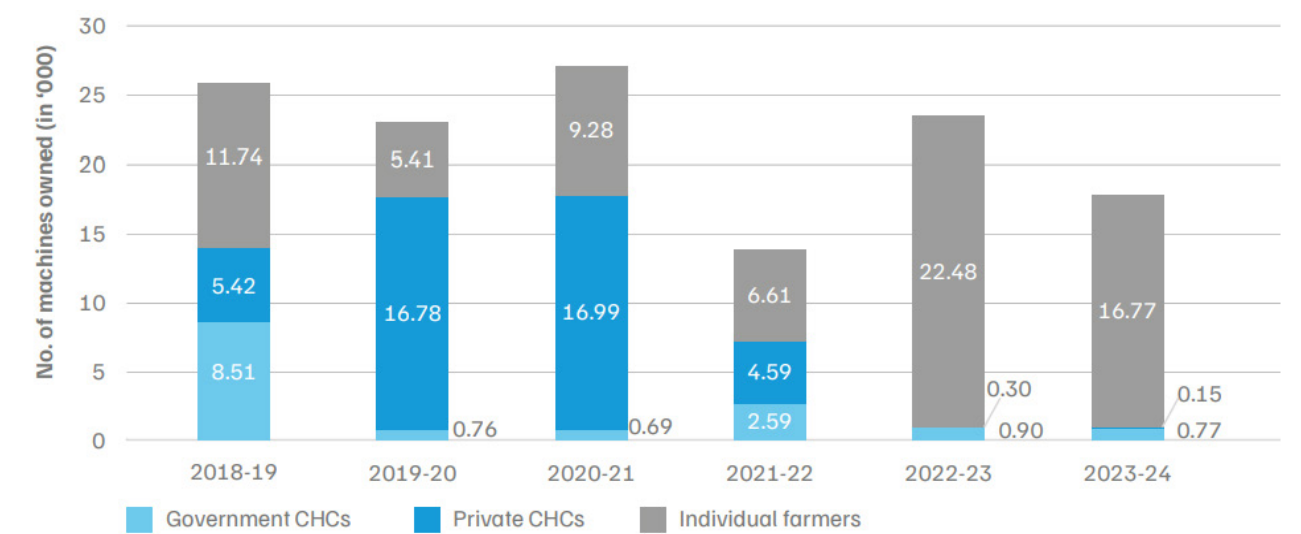


Image Source: CEEW

What Farmers Are Telling Us

Reports are not the exclusive source of the most illuminating responses. One of the most grounded field investigations on climate and agricultural practice in recent memory was carried out between January and March 2024 by DevInsights, a development research organization that specializes in impact assessment. Using a cross-sectional mixed-methods methodology, the study conducted interviews with 600 farmers in 60 villages in Ambala, Haryana,

and Ludhiana, Punjab.

When 600 farmers from 60 villages are asked what they know, what they deal with, and what they would need to farm differently, their responses do not reflect denial or apathy; rather, they provide a thorough description of a system that has left them without a workable alternative to the practices that are exacerbating the very crisis that surrounds them. Crop residue burning is not a choice made against the environment; it is a choice made within an economic and agricultural structure that climate change is tightening with every passing season. This aims to focus on crop residue management, regenerative practices, and on-the-

ground

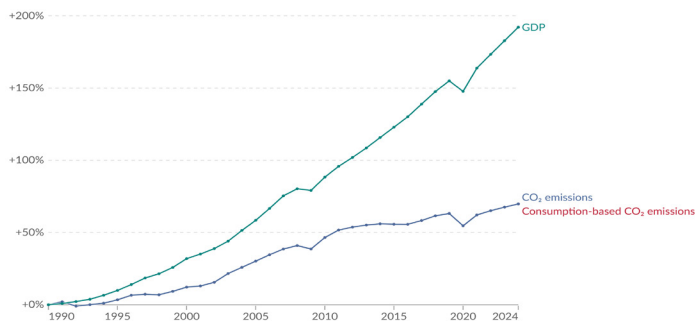
demonstration, which is significant because it treats the farmer not as the problem to be corrected but as the solution waiting for the right conditions.

What The Evidence Demands

When taken as a whole, these results do not characterize distinct crises. One system under stress is described. India's crop insurance program has paid out ₹1.92 lakh crore in claims since 2016, according to the PMFBY claims record. This is an institutional recognition that agricultural harm caused by climate change is already happening on a large scale.

Change in CO₂ emissions and GDP, World

Consumption-based emissions* are national emissions that have been adjusted for trade. This measures fossil fuel and industry emissions*. Land-use change emissions* are not included.



Data source: Eurostat, OECD, IMF, and World Bank (2026); Global Carbon Budget (2025)

Note: GDP is measured in international-\$ at 2021 prices to account for inflation and differences in living costs between countries. OurWorldinData.org/co2-and-greenhouse-gas-emissions | CC BY

Image Source: Our World in Data

India could lose between 3% and 10% of its GDP yearly by 2100 under high-emission scenarios, according to RBI-linked climate-risk assessments. Heat stress, water scarcity, and crop losses are predicted to disproportionately affect agriculture.

The evidence now calls for a solution at the scale of the issue: early warning systems linked to financial support rather than merely information; field-level infrastructure that provides smallholders with access to crop-residue-management technology and transition financing; crop

documents; and procurement systems that reward regenerative practices.

“Early warning is usually sufficient on its own,” FAO’s Kaveh Zahedi stated during COP30 in February 2026. We need

insurance built around the multi-year damage persistence the field study

money. In order to support farmers and agricultural communities in a way that mitigates the effects of a rise in the frequency of excessive heat, insurance is required [FAO, February 2026]. This indicates that early warning is insufficient for agriculture and excessive heat. In order to enable farmers and agricultural communities to endure more frequent heat stress, financing and insurance are also necessary.

The weather is not waiting. The ground is not waiting. The crops do not wait.



INDIA'S CLIMATE VULNERABILITY INDEX

A Deep Dive into the Risk Landscape and the Road Ahead



Mohita Bansal

Evidence- We Can No Longer Ignore

April 2026 recorded the second-highest average global sea surface temperatures for all oceans outside the polar regions, according to the European Centre for Medium-Range Weather Forecasts Copernicus Climate Change Service.

The 2026 southwest monsoon arrived early in the Andaman and Nicobar Islands, reported by India Meteorological Department. This signals another season of unusual weather that our infrastructure cannot manage.

India's Climate Vulnerability Index exposes how floods, droughts, heat-waves, and weak infrastructure are reshaping livelihoods—warning that resilience, not growth alone, will define the country's future.

The Indian Meteorological Department reports that a rise of just 0.6 to 0.7°C over the last century has set these changes in motion. According to the Germanwatch Global Climate Risk Index 2020, India is the fifth-most climate-vulnerable country in the world. The Intergovernmental Panel on Climate Change (IPCC) projects with that every degree of temperature rise leads to a 3% increase in precipitation intensity. What happens at 1.5°C or 2°C is not a distant scenario; it is the path we are following.

Ground Zero: Why Madhya Pradesh Tells the Whole Story

Before looking at the national situation, it is worth zooming into a single state. Madhya Pradesh (MP) is located in the geographic centre of India. Of its 72.6 million residents (Census 2011), about 72% live in rural areas and rely on agriculture, horticulture, forestry, fisheries, and livestock. These sectors are the most vulnerable to climate changes.

Floods, droughts and hailstorms cause seasonal migration throughout the state. Soil quality is declining. Rainfall patterns have become unpredictable. A study from 2000 by The Energy

and Resources Institute (TERI) identified several districts in MP as highly vulnerable to climate and economic shocks. Today, two decades later, many of those issues remain unaddressed. MP is not unique; it reflects the trends seen in many parts of India.

How the Numbers Were Built: A Nation-Wide First

The Indian Department of Science and Technology (DST), in 2020, assessed all Indian states using first-ever standard system for assessing climate vulnerability. This assessment system used standardized instruments, indices, procedures, and sources of data, which made assessments comparable. The goal was to make

comparative assessments between regions with different geography; for example, to assess Odisha, a coastal state, and Madhya Pradesh, a landlocked state, required standard tools rather than mere judgements.

Decoding the Index: What the CVI Actually Measures

Climatic Vulnerability Index (CVI) is an evaluation system for determining how vulnerable a place, system, or community is to the negative effects of climate change. It follows IPCC framework and is a part of India's National Vulnerability assessment framework. Vulnerability consists of three interlinked aspects.

- **Exposure** – The intensity and occurrence of climatic events such as floods and droughts, and the amount of climate related stress in an area.
- **Sensitivity** – The degree to which ecosystems, livelihoods, communities, and infrastructure are affected by climatic hazards.
- **Adaptive capacity** – System's ability to prepare for, respond to, and recover from climatic stresses and shocks. It shows how flexible a system is to cope with the impacts of climate stress.

Therefore, while a region that is highly exposed to climatic hazards may be able to adapt relatively well if it has a strong adaptive capacity, a region with moderate exposure to climatic hazards could suffer far greater negative impacts as a result of having high levels of poverty, lack of adequate infrastructure, and poor environmental conditions thereby significantly limiting its ability to adapt.

The Methodology in Brief

This assessment was done using secondary data (Tier 1 methodology) to maintain consistency. This assessment

involved multiple sectors, namely agriculture, forestry, health, and general sectors, and used data from 2011 to 2019. A total of 14 indicators consisting of biophysical, socioeconomic, and institutional indicators were chosen for assessing the state-level data depending on data availability. All 14 indicators were

normalised between 0 to 1 scale. Principal Component Analysis (PCA) revealed that each of the 14 indicators had almost equal weight, so each of these indicators was given an equal weight ($1/14 = 0.071$). The average of these 14 normalised scores was considered as vulnerability index for the state.

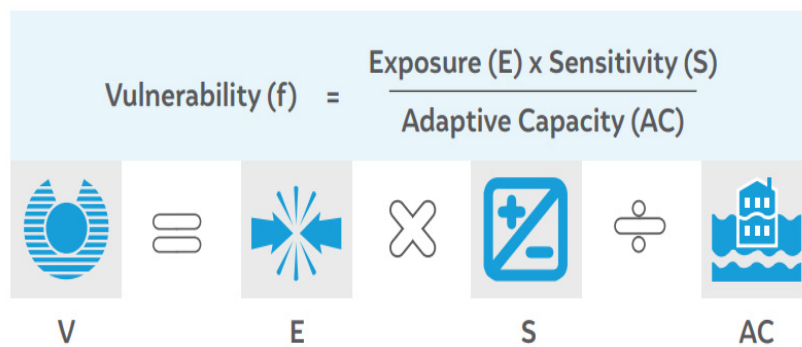


Figure 1: : Vulnerability function, Source: CEEW Mapping India's Climate Vulnerability

The 14 Indicators Across Three Domains

Domain	Indicator
Socioeconomic Characteristics and Livelihood Features	The percentage of the population living below the poverty line
	The percentage of income from natural resources
	The percentage of horticulture as part of total agriculture
	The proportion of marginal and small holdings
	The percentage of women participating in the labour force
Biophysical Factors	The variability of yields in food grains
	The area of rain-fed agriculture
	The incidence of vector and water-borne diseases
Institutions and Infrastructure	The percentage of farmers with crop insurance
	MGNREGA implemented
	The density of roads and railways
	The density of health care workers
	The amount of forest land per 1000 of rural population
	The number of people required to work in woodlands

Each of the indicators was explicit in its reason for being selected as the measure. For instance, as individuals below the poverty line possess little financial capital, they possess the least ability to adapt. Rain-fed agriculture will be significantly impacted by the variability of rainfall. Crop insurance will enable the producer to offset their potential losses. Forest area provides alternative sources of income to producers through the Sustainable Non-Timber Forest Product (NTFP) economy.

Vulnerability Ranking of 29 States

Perhaps the single most sobering finding based on Climate Vulnerability Assessment data is this: all 29 Indian states are vulnerable, with vulnerability indices ranging from 0.42 to 0.67. Even the lowest score is well close to the midpoint of a 0–1 scale.

Jharkhand leads the vulnerability ranking at 0.67, followed by

Mizoram (0.64), Odisha (0.63), Chhattisgarh (0.62), Bihar (0.62), Assam (0.61), Arunachal Pradesh (0.59), and West Bengal (0.59). Maharashtra, at the other end, scores 0.42, lowest among all states, but not untouched. Districts in Maharashtra's Marathwada and Vidarbha regions suffer from severe and recurring drought; the state was among nine officially declared drought-affected in 2015.

Categorization of States Based on Vulnerability Indices (VI)

The value of VI for Indian states suggests that all states are vulnerable to climate risks, but some are relatively more. Grouping of states helps to get a better idea of different categories of states in the context of the VI range. The range of index (0.42–0.67) was divided into three equal intervals and categorised as relatively highly vulnerable (0.58–0.67), relatively moderately vulnerable (0.50–0.58), and relatively low vulnerable (0.42–0.50).

From the below heatmap it is evident from a geographical perspective that majority of the states, categorised as higher vulnerability, are clusters in the eastern part of India. Out of these, Mizoram, Assam, Arunachal Pradesh, and the hill districts of West Bengal are located in situated in the ecologically fragile Eastern Himalayan region. The locations of these states coincide with the zones that are disaster-prone as per the multi-hazard maps created by NDMA in 2016. This puts those states in a doubly disadvantageous position.



Figure 1: : Vulnerability function
Vulnerability

The below table presents the categorisation of states in tabular format.

Category	Index Value	States
Relatively highly vulnerable	0.58-0.67	Jharkhand, Mizoram, Orissa, Chhattisgarh, Assam, Bihar, Arunachal Pradesh, West Bengal.
Relatively moderately vulnerable	0.50-0.58	Uttar Pradesh, Tripura, Gujarat, Meghalaya, Jammu & Kashmir, Rajasthan, Madhya Pradesh, Manipur, Andhra Pradesh, Karnataka
Relatively low vulnerable	0.42-0.50	Himachal Pradesh, Telangana, Sikkim, Punjab, Uttarakhand, Haryana, Tamil Nadu, Kerala, Nagaland, Goa, Maharashtra

District Level Vulnerability Mapping

Identification of the most vulnerable districts along with the drivers is an essential first step for prioritizing investment in climate adaptation at the district level. The set of fourteen indicators was used to assess the district level VI; however, these were not exactly the same as what had been used for the state-level analysis given the non-availability of data at the district level. The assessment was based on 612 districts; some of the

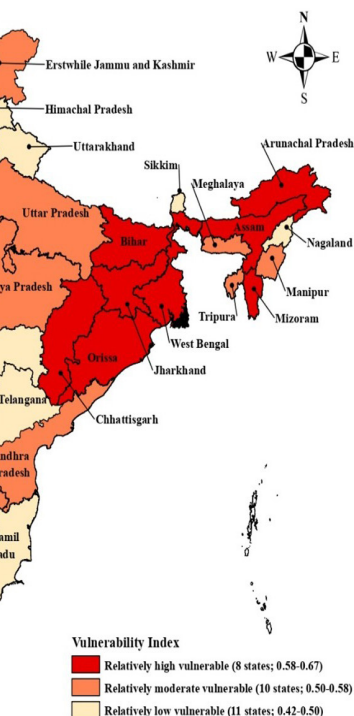
recent bifurcations of districts were not taken into consideration due to lack of availability of data for the indicators.

While both assessments examine sensitivity and adaptive capacity, the district-level CVI gives greater attention to household conditions, local infrastructure, and livelihood patterns that often vary widely within a state.

Several indicators remain common across both levels, such as rainfed agriculture, crop insurance coverage, marginal and small landholdings, women's participation in the workforce, forest area, yield variability of food grains, road density, and MGNREGA implementation. These indicators help maintain

comparability between state and district assessments and reflect key dimensions of climate vulnerability linked to livelihoods, agriculture, institutions, and natural resources.

However, more localized indicators were used at the district-level assessment. Some of the indicators were household income below Rs. 5,000, livestock-to-human ratio, female literacy, health infrastructure, and access to improved drinking water. These indicators were included because vulnerability often differs sharply across districts within the same state. District-level indicators help identify gaps in socio-economic inequalities, local adaptive capacity, and basic services that may remain hidden in state averages.



Domain	Indicator
Socioeconomic Characteristics and Livelihood Features	Percentage of households having monthly income of highest earning members less than Rs. 5,000/- in the rural area,
	Livestock to human ratio,
	Proportion of marginal and small landholder,
	Women's participation in the workforce,
	Proportion of net sown area under horticulture,
Biophysical Factors	Female literacy rate,
	Forest area per 100 rural population,
	The area under rainfed agriculture,
	Yield variability of food grains,
Institutions and Infrastructure	Road density,
	MGNREGA implementation,
	Area covered under crop insurance,
	Health infrastructure per 1000 population,
	% of households with an improved drinking water source.

Based on vulnerability indices, the districts were ranked to find the most vulnerable, Karimganj in Assam (0.75 VI), and the least vulnerable, Lahul & Spiti in Himachal Pradesh (0.34 VI) districts. As presented in the below table, most districts in the category of 5 most vulnerable districts in India were in Assam (20 districts) and Bihar

(14 districts). In the Indian Himalayan Region, one district in Jammu and Kashmir in the western part and one district in Manipur in the eastern part also came under this category. Geographically, most of these fifty districts are in the Indo-Gangetic Plain and the Brahmaputra River basin. Both areas are considered flood prone.

Indian States	No. of Districts among top 50 most vulnerable districts
Assam	20
Bihar	14
Tamil Nadu	3
West Bengal	3
Jharkhand	2
Orissa	2
Uttar Pradesh	2
Haryana	1
Jammu & Kashmir	1
Maharashtra	1
Manipur	1

Categorization of Districts: Based on Vulnerability Indices

Categorisation of districts also helps in the identification of states with a high prevalence of vulnerable districts. All, 612 districts are divided into four categories based on Quartiles. Each category contained an equal number (153) of districts, placed in order of ranking. The resultant range of VI for quartiles I, II, III and IV are ~0.61-0.75, ~0.56-0.61, ~0.51-0.56 and ~0.34-0.51 respectively.

The analysis shown in below graph highlights that approximately 90% of districts in Assam, ~80% of districts in Bihar, and ~60% of districts in Jharkhand fall in Quartile I. Which indicates, these states experience high level of vulnerability. In the state-level vulnerability assessment, these three states were also in the highly vulnerable category. Other than these three states, Andhra Pradesh, Gujarat, Jammu and Kashmir,

Maharashtra, Manipur, Orissa, Uttar Pradesh, and West Bengal also have more than 50% districts in Quartiles I and II combined reflecting the high vulnerability of a large number of districts. Other than Maharashtra, the rest of these states in the state-level vulnerability assessment were also either in high or moderately vulnerable categories.

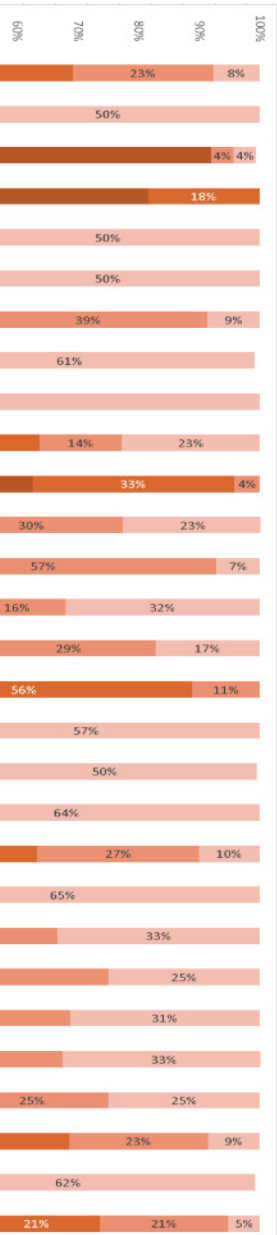
A hypothesis presented in the state-level assessment on Maharashtra has been corroborated in this district level assessment. The state-level report had observed that the presence of cities such as Mumbai and Pune significantly contributed to the state's GDP leading to a relatively low vulnerability for Maharashtra at state level. It does not imply that all districts in the state have a low vulnerability, though. In the present assessment, over 50% of districts, especially the drought-prone ones were found to be highly vulnerable and were either Quartile I or II. Gujarat is an interesting case, where no district is found in Quartile I. But more than 50% falls in Quartile II, which increases the overall vulnerability of the state.



The Drivers: What Makes a State More Vulnerable?

Identifying the drivers of vulnerability for each of India's states is critical for effective targeted adaptation planning. The recommended major drivers of vulnerability for each of the states included indicators that had normalized values of ≥ 0.8 .

The below graph showcases



the frequency of a major driver indicators across states. The major drivers of vulnerability include: a lack of forest area per 1000 population (reported in 17 states), leading to a lack of alternative livelihood based on forest resources, a high proportion of area under rainfed agriculture (reported

in ten states), and a lack of coverage of central crop insurance schemes (reported in 11 states). All these indicators contribute to high vulnerability of the agricultural sector, on which more than half of the Indian population depends.

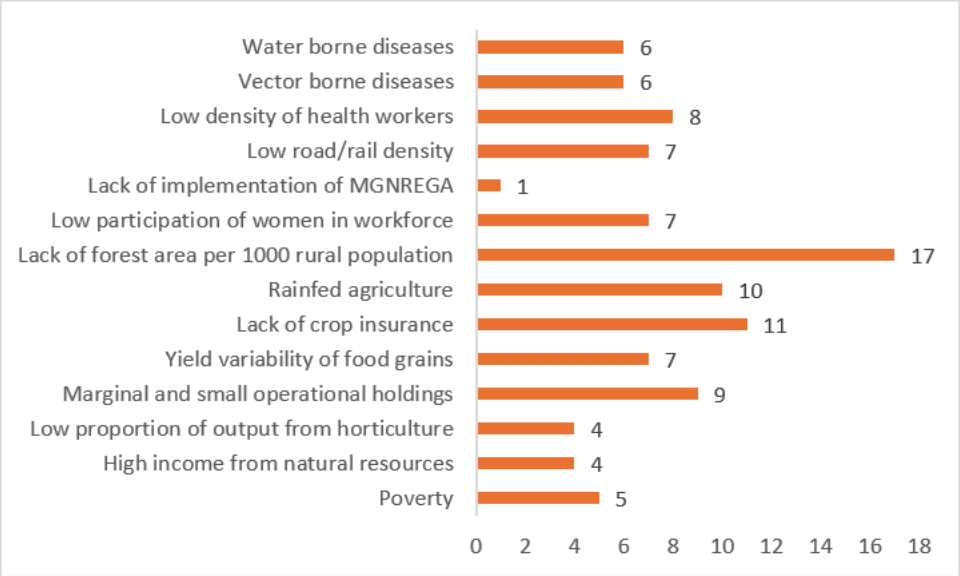


Figure 6: Frequency of an indicator that appears to be a driver across states.

In the most vulnerable states like Jharkhand, Mizoram, and Bihar, the following factors contribute to the multidimensional vulnerabilities: (1) poverty, (2) reliance on rainfed agriculture, (3) prevalence of disease, (4) insufficient number of health care workers, (5) poor infrastructure, and (6) lack of forest cover.

In the moderately vulnerable states, the susceptibility to drought and dry spells is primarily due to the absence of forest cover, health sector concerns, and these states do possess some level of adaptive capacity due to the significantly lower percentage of BPL individuals and

better implementation of MGNREGA, than the most vulnerable states.

For the lower vulnerable states in India, the range of factors or drivers that contribute to their overall level of vulnerability is more limited, including the following: (1) absence of forest cover, (2) lack of crop insurance, and (3) reliance on rainfed agriculture; however, the lower vulnerable states receive very high scores for institutional indicators including MGNREGA, road-rail density, and the number of health care workers. One notable reason for a relatively low VI for Maharashtra is the presence of cities such as Mumbai and Pune that significantly

contributed to the state's GDP. This means that a low proportion of GDP is coming from the primary/ agricultural sector there. Maharashtra also has a severe agricultural vulnerability. A Central Research Institute for Dryland Agriculture study (CRIDA) conducted in 2019 reported that a large number of districts in the state suffer from a major agricultural vulnerability. Moreover, this state is drought-prone, it was one of nine Indian states to have been officially declared drought-prone in 2015.

What Is Being Done — And What Is Not

India is at the forefront of establishing a disaster risk reduction structure, as demonstrated by the country being a signatory of the Sendai Framework for Disaster Risk Reduction (2015–2030), and being the founding chair of the Coalition for Disaster Resilient Infrastructure (CDRI), which has 27 other member countries. The National Disaster Management Authority (NDMA) has also partnered with states to set up early warning systems and evacuation plan frameworks, which has led to a decrease in total cyclone-related deaths (2000–2020) in India, and is a commendable achievement.

The DST's (2020) National Climate Vulnerability Assessment provided a common framework for 29 states with respect to agriculture, forestry, health and various other sectors. There are multiple states that have created comprehensive State Action Plans on Climate Change (SAPCC) including Odisha, Tamil Nadu and Kerala which clearly illustrate that SAPCCs that receive adequate funding and support at the institutional level can result in a substantial reduction in loss of life.

However, there continues to be a large gap between what exists and what is required. As reported in 2021 by CEEW in, "Mapping India's Climate Vulnerability- A District-Level Assessment," only 63% of India's districts have a District Disaster Management Plan currently (from 2019), and a mere 32% of these plans have been updated. Nationally, only 0.86% of districts possess high adaptive capacity; 67% of districts possess moderate adaptive capacity and 32% of India's districts possess low adaptive capacity.

What Can Individuals Do? More Than You Might Think

The primary function of climate vulnerability assessment is as a policy tool; however, change occurs at the individual level due to human interaction with the environment. Households choose how to manage their water, whether to plant trees on their property, and how to manage the soil. These choices lead households to manage the overall adaptability of their environment.

Farmers can have the overall impact of making their land more resilient to droughts. Simply by planting some drought resistant crops, investing in soil moisture management, or joining a crop insurance program as a farmer, they make the land more resilient, and as a collective, the agricultural sector.

Urban residents can have the impact of making their neighbourhoods less vulnerable to droughts through the management of permeability of their soil and crops, tree preservation advocates through community committees, and the preparation of a flood possibly through a flood and the management of a heatwave.

The most impactful way to create change will be to collectively

demand improved governance of climate-related risk. For example, approximately 63% of districts do not have an approved District Disaster Management Plan (DDMP) in them (many of them are years out of date), which reflects poor priorities of bureaucrats. Local citizen action through local councils (Panchayats), local municipal (city) governments, and elected officials will force a rethinking of bureaucratic priorities. From there, the pressure will be on bureaucrats to produce projects that create a more sustainable infrastructure, properly manage our coastlines, and protect wetlands. Creating systemic change in this case will lead to more robust forms of climate governance.



The Map Exists. The Question Is What We Do with It.

The CVI is not a judgment, it is an evaluation. Extreme climate events have increased by approximately two hundred percent since 2005; according to the International Labour Organization, inaction concerning heat waves means that India will lose thirty-four million jobs by 2030; according to ActionAid, as a result of climate change, as many as forty-five million people in India could be forced to leave their homes by 2050.

Fortunately, the tools needed to take action are available. India now has both a vulnerability framework at the district scale and a common method for assessing that vulnerability; there is considerable growth in State Action Plans for Climate Change (SAPCCs) by various states; and the Coalition for Disaster Resilient Infrastructure (CDRI) has positioned India as a leader internationally in terms of disaster risk reduction and adaptation.

The Sixth Assessment Report of the IPCC substantiates, at a global level, what the CVI shows at a local level, that the world has already committed to surpassing 1.5°C, which will occur much sooner than has been previously predicted.

The next decade will determine whether India will utilize these available tools or set them aside in favour of short-term growth indicators. A USD five trillion economy based on climate-vulnerable infrastructure is not really a USD five trillion economy; rather, it is a USD five trillion responsibility. If the CVI is interpreted appropriately, it presents an opportunity for significant change in how we design and construct. The opportunity to respond to that invitation is decreasing with each monsoon season that goes by.



SHASHI SHEKHAR

The Water that Sustains Life



Janmojaya Barik

There's a type of courage you don't always notice, but it takes real guts and a special kind of patience: the courage to challenge the system from inside. Think about the researcher who puts out findings nobody wants to hear, or the judge who gives an unpopular verdict. Then there's the administrator who tells the government its most basic assumptions are dead wrong. That last form of courage sums up Shashi Shekhar's career. He joined the Indian Administrative Service in 1981, Tamil Nadu cadre, and over the years, he's left his mark on India's energy, water, and rivers which are three issues that will tell the story of the country's environmental future.

You might not recognize his name, and honestly, that's not unusual. People rarely remember the folks who build institutions, especially in a media world obsessed with political celebrities. But if you've heard of the Energy Conservation Act of 2002, the Bureau of Energy Efficiency, or noticed the shift from just building dams to actually understanding water ecosystems in government talk, you're seeing Shashi's fingerprints. His push to treat rivers as living systems, not just infrastructure, is another sign of his impact. These changes still ripple through India's policies today.

From Rocks to Reforms

Shashi Shekhar studied geology at Patna University before cracking the IAS. Geology wasn't just a background detail. Studying rocks means you learn how systems connect, how an action in one place messes with things somewhere else, how underground water links to rivers, how long-term changes unfold. These are exactly the kinds of perspectives India's water and energy policies have missed. Shashi kept trying to weave that systems thinking into big, complex bureaucracies built on simple, convenient assumptions.

In his early days, He served as a collector in Pudukkottai and The Nilgiris, senior stints in the Municipal and Water Department, as well as roles in transport and urban infrastructure finance. Running agencies like Tamil Nadu Minerals Limited and the Urban Development Fund gave him a rare, hands-on sense of how state governments put big projects together. When he moved to Delhi for a central government post as Joint Secretary in the Ministry

of Power, he brought both street-level experience and a habit of seeing the bigger picture.

Building Energy Governance from Scratch

The Energy Conservation Act of 2002 stands out as Shashi's clearest legislative legacy. Multiple sources, including profiles by the World Resources Institute and the Sadhguru Encyclopedia credits him with drafting what eventually became this cornerstone law. The Act did a lot: it forced energy-hungry industries to follow efficiency norms, mandated energy audits, kicked off the Energy Conservation Building Code, and, maybe most important, set up the Bureau of Energy Efficiency (BEE).

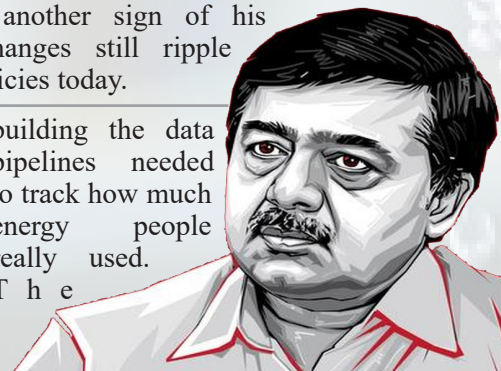
Shashi was BEE's first Director-General. And here's what people often miss, he didn't just write a law and walk away. He actually built the system to make that law work on the ground. That meant setting up rules, training teams, convincing industries, and

building the data pipelines needed to track how much energy people really used.

Th e

Bureau of Energy Efficiency has since become a pillar of India's energy policy, and the appliance standards it set up have changed what people buy and how homes use power. Those origins trace straight back to Shashi's work.

Later, at the Ministry of New and Renewable Energy, Shashi pushed a new idea in the 12th Plan draft: India shouldn't forever subsidize wind and solar. They needed a real market, not endless welfare. At the time, most people didn't see it that way. But since then, Indian solar prices fell from around Rs 17 per unit in 2010 to below Rs 2 by 2020 in competitive bids — a drop documented in MNRE and CERC auction records. Sure, price drops have had many causes but treating renewables as a real market was a leap the system had to make before the rest followed.



Challenging Water Orthodoxy

When Shashi became Secretary at the Ministry of Water Resources, River Development and Ganga Rejuvenation, he walked into a ministry run by the old story: build more supply, solve the problem. More dams, more canals, big inter-basin transfers, these were seen as the answer. Politicians love big water projects because they're easy to point to during elections. Water conservation is a harder sell since its wins are blurry and spread out.

Shashi didn't just go along with this. In a rare, blunt interview as a senior bureaucrat, he said: "Our overall approach...needs an overhaul. So far, our entire thrust has been on the supply side.

We need to fundamentally understand the water ecosystem and unless we do that, we will never be able to form a proper action plan or policy." That's a bold thing to say from inside the system.

He didn't stop talking. Shashi pushed for official policies that focused on water budgeting and accounting but on ways to treat water as a scarce resource, not something you just grab and distribute. He advocated shifting crop patterns to use less water, instead of just building more irrigation. He kept highlighting that 64 percent of India's irrigation depends on rapidly depleting groundwater, something dam-focused policies ignore because groundwater doesn't come from those surface projects.

Rethinking Rivers

Maybe the deepest shift Shashi has pushed is

to treat rivers as living ecosystems instead of plumbing. His work nudged ministries to ask new questions: not just "Can this dam deliver water efficiently?" but "Will this change wreck river flows, kill off local species, disrupt communities, or ruin essential ecological roles?" India's law has long required environmental checks for big water projects, but, to be honest, those reviews often felt like paperwork. Shashi helped push the idea that proper ecosystem assessment should actually influence outcomes, not just tick boxes.

After he retired, Shashi didn't exactly disappear. He joined the Rally for Rivers board, supported policies pushing for buffer zones along rivers, sat on the National Water Policy committee, worked with the World Resources Institute, and brought hands-on experience to debates around river interlinking—a project he's seen up close instead of just theorizing about.

What Shashi Shekhar's Career Really Shows

There's a lesson in all this about working as a reformer inside India's bureaucracy. The Energy Conservation Act and the Bureau of Energy Efficiency stood strong long after Shashi left. His demand for smarter water management and deeper ecosystem thinking has changed the conversation, but old habits and political incentives keep pulling things back toward shiny new dams and supply-side fixes. The idea that rivers are complex, living systems? That's still up for debate, even when it's written into

official statements. Does that mean Shashi failed? Not at all. That's just how institutional change works in a giant democracy, leaders make policy, but the machinery carries slow, heavy habits. Shifting how a system thinks and acts, building a framework that lasts, and staying engaged for decades is a rare feat in any field.

In 2026, as India faces a weak monsoon, a worsening groundwater crunch, and a water management model still hooked on old-school supply thinking, the vision Shashi spent his career fighting for is more urgent than ever. He always saw water not just as a resource, but as a system—one that asks for patience, courage, and for the rare person willing to challenge the basics. India's water crisis in 2026 is unfolding much like Shashi warned it would three decades ago — back when few people in the ministry were willing to listen. Today, the debate is no longer about whether his concerns were valid. The real question is whether the system can still act quickly enough to prevent the situation from getting worse.



Environment in the Age of Hyper-Connectivity:



Sonali Maheshwari

Beyond the World Around Us to the Human Within It

What truly defines an environment? Is it only the quality of air, water, forests, biodiversity, and climate resilience, or is it also reflected in the condition of human relationships, emotional well-being, dignity of labour, social trust, and the psychological resilience of societies? Perhaps the way we understand “environment” itself requires deeper reflection. Because increasingly, the indicators we use to measure society are also becoming indicators of the environments we are collectively creating.

In that sense, reports such as the NCRB data are not merely crime or health statistics; they are social and civilisational markers. They reveal the deeper condition of our economic, emotional, institutional, and behavioural ecosystems. They tell us not only how people are living, but what kinds of pressures, insecurities, aspirations, disconnections, and vulnerabilities are becoming embedded within modern systems of growth and development.

The latest NCRB 2024 report is therefore far more than a statistical document; it is an unsettling reflection of the environments we are collectively normalising. Beneath the numbers lies a deeper story about the hidden psychological, social, and economic costs

of contemporary development models.

The findings compel us to move beyond the language of individual tragedy and confront a larger systemic reality. Suicide is not merely a personal failure or momentary weakness, and the phrase “committed suicide” itself demands retirement from our vocabulary. Suicide is often the extreme outcome of untreated mental illness, prolonged distress, social isolation, economic insecurity, emotional exhaustion, and collapsing support systems i.e. conditions shaped not only by individuals, but by the environments surrounding them.



MENTAL WELL-BEING IS SHAPED BY AN INTERCONNECTED ENVIRONMENT

Relationships

Economic
security

Dignity
of work

Emotional
safety

Access to
care

Social
acceptance

Strong
institutions &
communities

When these systems weaken together,
DISTRESS IS NOT JUST PERSONAL. IT IS ENVIRONMENTAL.

The data reveals deeply concerning patterns. Daily wage earners remain the most vulnerable occupational group, accounting for 31% of all suicide victims, while nearly 63% of victims lived on annual incomes below ₹1 lakh. At

a time when platform economies celebrate flexibility, speed, scalability, and entrepreneurial freedom, millions powering these systems continue to navigate precarious livelihoods without stable incomes, healthcare access,

social protection, or psychological safety. The modern economic environment increasingly rewards productivity and efficiency while quietly externalising human vulnerability and emotional fatigue.

Equally concerning is the demographic profile emerging from the data. India's much-celebrated "demographic dividend" appears to be under immense psychological strain. The age groups of 18–30 years and 30–45 years together account for more than 65% of suicide cases. These



are not merely statistics; they represent the country's primary working, caregiving, aspiring, and economically productive populations. The very demographic expected to drive India's growth story is simultaneously navigating unprecedented emotional, financial, and social pressures.

The report also disrupts several

long-held assumptions around social security and emotional protection. Marriage, often perceived as a universal emotional safeguard, appears unable to insulate individuals from distress, with 67.5% of victims being married. Similarly, "family problems" remain the leading recorded cause of suicide in India. This raises uncomfortable but necessary questions about the condition of contemporary social environments themselves. What does it indicate when the institution traditionally associated with emotional support increasingly emerges within narratives of psychological distress? What kinds of social pressures, expectations, emotional disconnects, invisible care burdens, and unresolved anxieties are accumulating beneath the surface of everyday life?

To understand mental illness meaningfully, one must move beyond purely medical interpretations and recognise the intersection of biological, psychological, and social realities. A person's mental well-being is shaped not only by neurochemistry, but also by relationships, economic security, dignity of work, emotional safety, access to care, social acceptance, and the quality of institutional and community support systems around them. When all these systems weaken

simultaneously, distress ceases to remain an isolated individual condition and increasingly becomes an environmental outcome. And perhaps this is where the modern understanding of "environment" itself requires urgent expansion.



For decades, environment has largely been understood through ecological imagery including forests, rivers, pollution, climate change, biodiversity, and natural resource depletion. While these remain central and urgent concerns, the world we inhabit today is shaped by far more layered and interconnected environments. The modern environment is no longer only ecological; it is simultaneously economic, digital, technological, social, institutional, emotional, and behavioural.

The NCRB findings are therefore not disconnected from discussions around environment; they are evidence of how deeply interconnected our environmental sub-systems have always been, and how intensely they are interacting in the present era. The platform economy creates one kind of environment. Social media creates another. Urban living conditions create another. Climate anxiety shapes yet another. Labour insecurity, migration stress, rising aspirations, digital hyper-connectivity, algorithm-driven work systems, weakened community bonds, and the constant pressure to perform collectively influence mental well-being and social resilience.

ENVIRONMENT
Beyond nature.
Beyond what we see.
Into what shapes us.

The environments around us
become the lives within us.

THE ENVIRONMENT
IS MORE THAN WHAT SURROUNDS US.
IT IS WHAT BUILDS US... OR BREAKS US.

Environment has perhaps always been a network of interconnected ecosystems and sub-systems such as ecological, social, economic, cultural, technological, and institutional and they are continuously shaping one another in visible and invisible ways. What has changed today is not this interconnectedness itself, but the scale, speed, complexity, and intensity with which these systems influence human life

simultaneously.

The emerging trends and data increasingly indicate that while societies are becoming more technologically advanced and economically accelerated, many human support systems are simultaneously becoming more fragile. Rising psychological distress, loneliness, burnout, economic precarity, weakened social cohesion, invisible care

burdens, emotional fatigue, and declining community support structures suggest that progress is not always translating into well-being. In many ways, the environments being created around productivity, hyper-connectivity, competition, optimisation, and transactional living are beginning to outpace the environments needed for emotional resilience, dignity, belonging, empathy, and care.



If these patterns continue unchecked, the future risk may not only be ecological instability or economic inequality, but a gradual erosion of the human condition itself, where efficiency grows but emotional security declines; connectivity expands but human connection weakens; productivity rises but exhaustion deepens; and prosperity increases while collective well-being remains uneven, fragile, and emotionally unsustained.

Perhaps, then, the most important environmental indicators of the future may not only be carbon

levels, air quality indices, or GDP growth rates, but also the condition of human relationships, emotional resilience, social trust, mental well-being, dignity of labour, and the ability of societies to sustain care, compassion, belonging, and hope. Because ultimately, environment is not only about the planet we inhabit. It is equally about the human conditions we are creating within it and whether the systems we are building are enabling people merely to survive, or genuinely allowing them to live with dignity, security, meaning, and emotional well-being.

About Author:

Sonali Maheshwari is a development sector practitioner and thought contributor with 17 years of experience in designing and advancing programmes at the intersection of policy, systems, and partnerships. Her work centers on bridging policy intent with on-ground impact through evidence-driven programme design and cross-sector collaboration.



COOLING IN A WARMING WORLD

Living, Working, and Surviving the Heat by Selco Foundation



By early afternoon, India's streets empty as tin roofs and concrete trap relentless heat. For millions of outdoor, daily wage workers, these are the hardest hours. "In forty years, I've never known a summer so harsh," says Akhlaq, a street vendor who watches his produce wilt—and his earnings with it.

Such stories are now routine. Summers arrive earlier, last longer, and hit harder—but not everyone suffers equally. Low-income homes built of heat absorbing materials stay stifling even after sunset. Women shoulder added strain, trading rest for round-the-clock caregiving. Informal workers lose income as heat drains stamina and shortens workdays; even small temperature rises can sharply cut daily earnings.

Cooling isn't a luxury—but it's still often seen as synonymous with air conditioning,

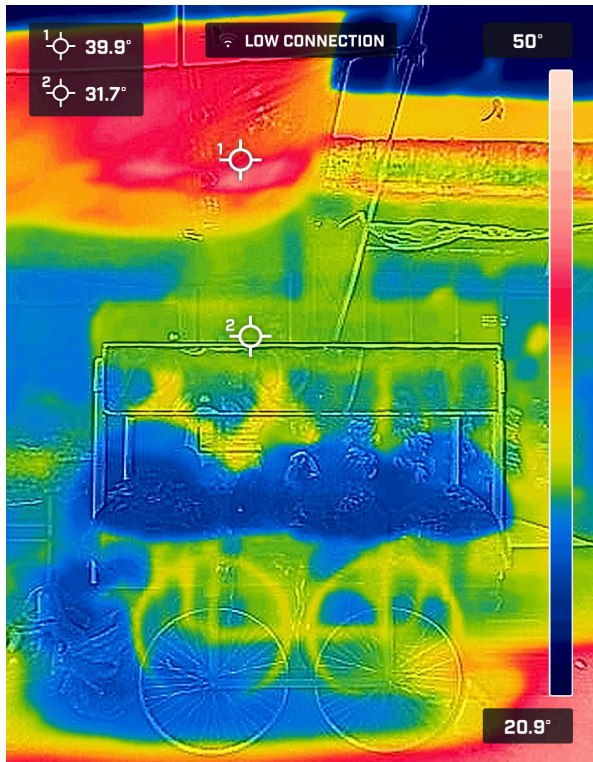
As extreme heat reshapes daily life in India, innovators and communities are rethinking cooling beyond air conditioners—building affordable, low-energy solutions that protect health, livelihoods, and dignity in a warming world.

which remains unaffordable and unreliable for many. A more grounded approach looks at cooling as a set of practical, low-energy solutions that fit into everyday life. This thinking shaped SELCO Foundation's implementations, and conversations around Practitioner's Dialogue on Action for Cooling brought together innovators, practitioners, policymakers, and communities to explore inclusive, scalable cooling solutions in through a webinar series hosted by the Foundation in November–December 2025.

Key insights from the series have been shared here. While not exhaustive, it highlights community-driven, context-specific approaches from across geographies, offering practical lessons for policy, programmes, and collaboration—while recognising that cooling solutions must be diverse and locally tailored.

Cooling That Protects Livelihoods

Street vendors selling fresh produce have long relied on sprinkling water, wet cloths, or shade. Often, these practices are not enough to prevent spoiling. New low-energy solutions show how targeted cooling can directly protect incomes.



RuKart's Subjee Cooler, for example, uses just 4–15 litres of water a day to create evaporative cold storage, keeping vegetables between 10 and 21°C. By slowing spoilage from farm to market, it cuts post-harvest losses and boosts earnings.

Trane technologies under their employee powered innovative programme, Operation Possible, designed a cart-based solution that addresses excessive heat and moisture loss without adding complexity. The solution was

focused on vegetable vendors who constantly sprinkle water and cover produce with wet cloth during afternoons due to high heat. The heat leads to daily spoilage losses of up to ₹400 based on multiple discussions with street vendors.

The resulting system combines a passive radiative cooling canopy, collapsible shaded storage for overnight cooling, and a low-power water spray to slow spoilage. The model is now being prepared for

scale across India, Nigeria, and Ghana, in partnership with NGOs, manufacturers, and government bodies.

Saptkrishi's micro-climate-controlled Sabjikothi units extend shelf life and protect vendor incomes, with solar-powered variants for carts and vehicles including 4-wheel cart, 3-wheel cart, E-carts. These units are designed to significantly reduce transit spoilage.

For vendors, these interventions are not about comfort alone.

They reduce daily losses, stabilise income, and restore dignity. Cooling, here, becomes livelihood infrastructure.

Energy for Cooling—Without the Burden

As temperatures rise, even basic appliances—fans, lights, small refrigerators—are becoming essential. Yet rising electricity bills impacts their

economic conditions.

Decentralised renewable energy offers an alternative. Well-designed rooftop solar systems can meet daytime cooling needs without increasing monthly expenses. Hybrid and community solar models are especially promising in dense urban areas where individual rooftops are limited.

Janaagraha shared grassroots insights from 5,368 Odisha households on solar adoption amid rising heat stress on how low-income communities perceive solar adoption in the context of rising heat stress. Urban low-income households remain highly energy-vulnerable despite widespread grid connectivity, with affordability emerging as the biggest challenge. While rooftop solar is seen as a reliable and value-for-money solution, barriers such as insecure housing, limited financing, documentation gaps, and weak service networks continue to restrict adoption.

Insights from SELCO India and EcoSoch Solar show that when government subsidies such as PM Surya Ghar are combined with EMI-based financing and smart system design, solar can work even for low-income households. Barriers remain—especially for renters and informal settlements—but simpler installation models and stronger service ecosystems could unlock scale.



Making Active Cooling More Efficient

Active cooling is increasingly unavoidable. The challenge is ensuring it does not push households deeper into energy poverty and contribute further towards emissions.

Energy-efficient fans and appliances use far less electricity while offering the same relief, yet inefficient models dominate because efficient ones cost more upfront. Market transformation can bridge this gap.

Drawing on EESL's experience in transforming India's LED market, tools such as bulk procurement, demand aggregation, DISCOM partnerships, consumer awareness, and innovative financing can reduce prices and shift demand. While these strategies are more complex for cost-intensive appliances like air conditioners, the principle holds.

Manufacturers like Carrier demonstrate that integrated solutions—combining efficient system design, smart setpoints, green refrigerants, and digital controls—can sharply reduce cooling energy use. Versa Drives Pvt Ltd similarly works across technology, market strategy, and consumer engagement to scale super-efficient BLDC ceiling fans. These fans are designed to be modular allowing easy repairs, uses minimum materials reducing environmental footprint. Adoption improves when people trust the technology, understand savings, and can pay overtime.



Letting Buildings Do the Work

Centre for Advanced Research in Building Science and Energy (CARBSE) emphasized the need to reframe passive cooling through the lens of thermal comfort, highlighting how efficient building design can deliver comfortable indoor environments while minimizing dependence on energy-intensive cooling systems. The discussion pointed to the potential of design strategies to reduce peak indoor temperatures by 5–7°C—bringing homes from extreme summer conditions of 36–42°C down to around 30–35°C—while also underscoring the challenge of scaling such innovations without compromising on quality and contextual sensitivity.

Various research suggests that in hot climates, 50–70 percent of indoor heat enters through the roof. For homes with untreated metal or asbestos sheets, this becomes a major source of indoor heat stress. Roof improvements—reflective coatings, insulation, shading, or ceiling systems—can reduce indoor temperatures by 2–7°C.

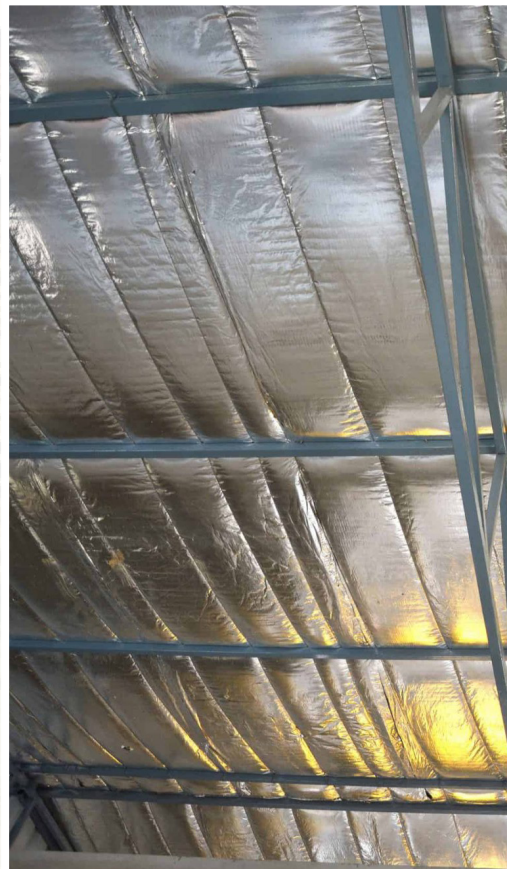
Balance highlighted how India's cooling solutions must be context-specific, modular, and designed to create co-benefits without introducing new vulnerabilities, while also recognizing that service models and community participation are as critical as the materials and technologies themselves. They have demonstrated this through pilots involving Alufoil, MLP sheets, rooftop gardens, wood wool panels, dormer windows, etc.

At the material level, innovators are reimagining insulation itself. Magra wool, agro-residues,

wild grasses, forest biomass, and recycled paper are being turned into low-carbon, high-performance insulation through decentralised production.

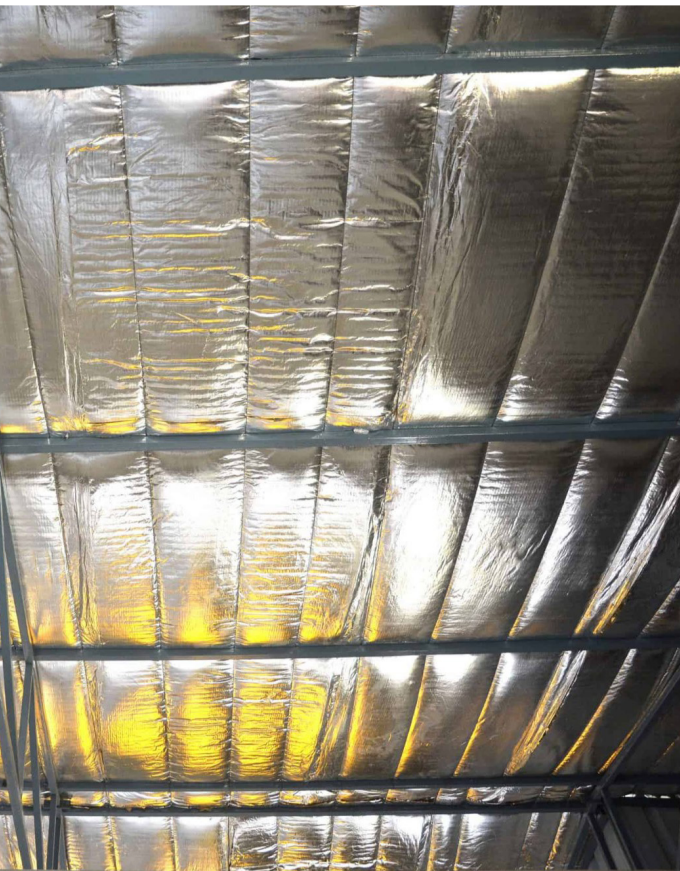
Gram Art Project, a 300-member collective, upcycles crop waste into products and is exploring waste-based thermal insulation.

Desert Resource Centre illustrates how building design shapes energy interactions through heat protection, modulation, and dissipation. Decentralized and locally driven innovations using natural fibres and agro-residues emerged as safe, low-energy,



high-performance insulation alternatives in their work, with the Magra model evolving from a dairy storage solution for pastoralists into thermo-acoustic insulation for homes, schools, bunkers, and public buildings.

Samakhya Sustainable Alternatives highlighted how Magra wool, sourced through pastoralist-led value chain, is being transformed into modular insulation solutions that combine strong thermal performance, climate resilience, and rural livelihood generation. The product is reported to have demonstrated cooling impacts of up to 10°C reduction between outdoor and indoor temperatures in dairy storage applications, highlighting the importance of design innovation and long-term R&D support for scaling biomaterial-based cooling solutions.



Hedrad Composite Panels showcased market-ready passive cooling panels using recycled paper technology, delivering 6–7°C insulation, low embodied carbon and dry construction mechanism. Performance of the panels across climates demonstrates indoor temperatures remaining 2–4°C

cooler in warm regions such as Karnataka and up to 15–16°C warmer in cold regions like Spiti and Kargil, while the decentralized, low-capex manufacturing model also supports women-led production.

What Scaling Cooling Will Take

To reach those most affected by heat, solutions must match lived realities and informal livelihoods; financing must reflect irregular incomes; service, maintenance, and repair must be local; and policy must treat cooling as essential infrastructure.

As Mahila Housing Trust's experience shows, community awareness building through women-led collectives, innovative finances like microloans and policy engagement can help cooling solutions reach scale when designed around real needs.

Collaboration across the ecosystem — grassroots organisations, vendors associations, community groups,

banks, innovators, manufacturers, utilities, and government—is essential.

Cooling as a Question of Justice

As the climate warms, access to cooling will increasingly determine who can work safely, sleep at night, and live with dignity. Those least responsible for climate change are bearing its harshest impacts.

When designed around how people live, work, and earn, cooling becomes a tool for resilience—protecting health, stabilising livelihoods, and easing pressure on energy systems. In a hotter future, staying cool may be as essential as access to clean water or shelter. The challenge now is ensuring cooling reaches those who need it most, in forms that genuinely fit their lives.

Disclaimer

This article draws from insights shared during the Practitioner's Dialogue on Action for Cooling and does not endorse any specific solution, organisation, or brand. It is not an exhaustive mapping of cooling interventions, but a selective set of examples intended to highlight practical learnings and emerging pathways. Effective cooling transitions will require a diversity of context specific approaches across geographies.

About Author:

SELCO has pioneered the delivery of sustainable energy to the poor in India in a manner that creates assets and results in long term poverty alleviation. These sustainable energy driven solutions increase incomes, improves quality of life, and alleviates poverty. SELCO Foundation seeks to inspire and implement socially, financially and environmentally inclusive solutions by improving access to sustainable energy

Sumant Sinha

The Banker Who Bet India's Clean Energy Future and Built It



Tanmay J. Urs

The Bet Nobody in Indian Finance Wanted to Take

In 2011, when Sumant Sinha left his position as Chief Financial Officer of the Aditya Birla Group's renewable energy business to found his own company, the Indian renewable energy sector was not yet the story it would become. Installed solar capacity in India at that point was negligible. Wind was modest. The sector was fragmented, regulatory frameworks were unstable, and the consensus in Indian corporate finance was that renewable energy was a government project, not a private enterprise opportunity.

Sinha saw it differently. He had IIT Delhi for engineering, IIM Calcutta for management, and Columbia University's School of International and Public Affairs for policy. He also had a career in investment banking with Citicorp Securities and ING Barings that had taught him how capital flows toward clarity. A combination that made him fluent in the three languages India's energy reform actually requires: technical, financial, and political.

Sumant Sinha turned a risky clean-energy gamble into one of India's biggest renewable success stories—reshaping the nation's energy future, one gigawatt at a time.

What he believed, and what ReNew Energy Global was built to prove, was that renewable energy in India was a commercial opportunity of historic scale, not a charity sector dressed in solar panels.

He was right. And the proof is now 18.5 gigawatts wide.

The Company and Its Numbers

As of March 31, 2025, ReNew's portfolio stands at approximately 18.5 GW, including projects under development and in the pipeline. Commissioned capacity stands at approximately 10 GW, making ReNew one of India's largest renewable energy producers and one of the fastest clean energy companies globally to reach the 10 GW milestone. [ReNew Annual Integrated Report FY 2024-25 / ReNew.com]

ReNew's renewable energy assets now account for approximately 10% of India's total solar and wind power generation. The company's projects power around 6 million homes in India and are estimated to reduce approximately 0.5% of India's total carbon emissions. [ReNew Annual Integrated Report FY 2024-25 / Business Wire, November 2024]

The company operates across more than 150 utility-scale projects. Its portfolio spans solar, wind, hydro, hybrid projects, and increasingly, battery energy storage systems — the technology that converts intermittent renewable generation into firm, dispatchable power. It is listed on the NASDAQ stock exchange, making it one of the first Indian renewable energy companies to access international public capital markets.

India added 33 GW of electricity capacity in FY 2024-25, with approximately 90% from renewables. To meet its 2030 target of 500 GW non-fossil fuel capacity, India requires an estimated USD 80–100 billion in annual investment.

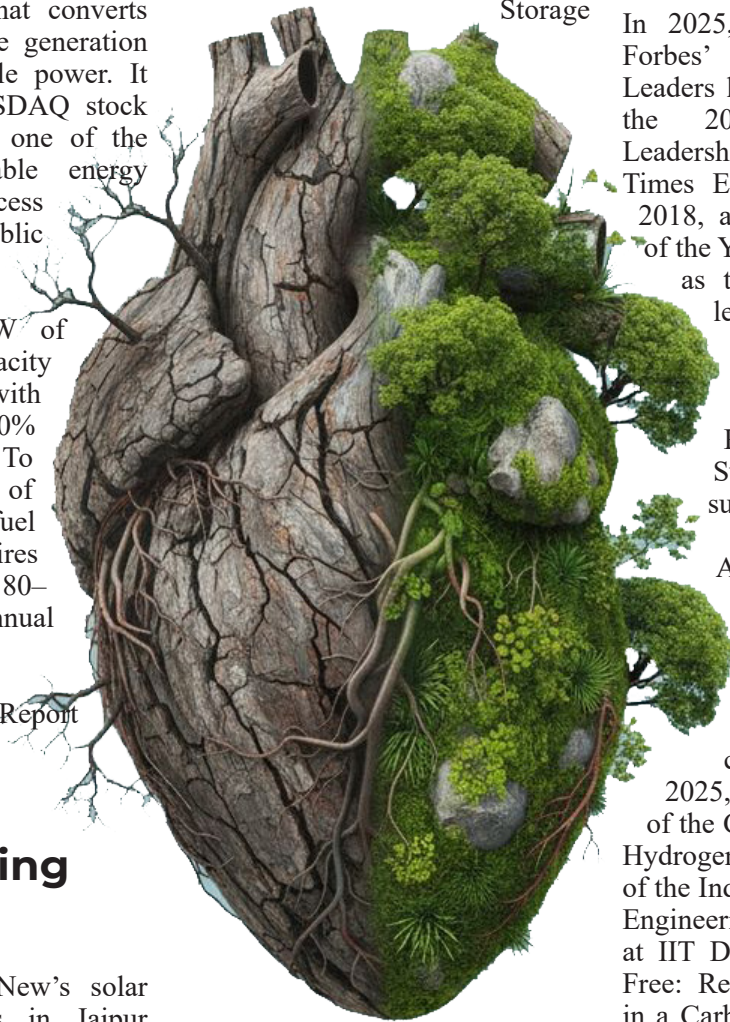
ReNew FY25 Annual Report
/ India CSR 2025

The Manufacturing Bet

In FY 2024-25, ReNew's solar manufacturing plants in Jaipur and Dholera reached a combined module capacity of 6.4 GW and cell capacity of 2.5 GW, making them fully operational and contributing to ReNew's profitability. [ReNew Annual Integrated Report FY 2024-25]

The manufacturing push is strategic and politically significant. India has committed under its Production Linked Incentive (PLI) scheme to build a domestic solar manufacturing ecosystem to reduce dependence on Chinese imports. ReNew's manufacturing scale positions it as a domestic supplier to India's growing project pipeline while also creating an export opportunity, now supplying solar modules to markets in Southeast Asia, Africa, and Europe.

ReNew also pioneered India's first utility-scale Battery Energy Storage



System (BESS), executing a 150 MWh project in Karnataka. The company's 1.3 GWp solar farm at Pokhran, Rajasthan — India's largest single-location solar project — was inaugurated in FY 2024-25.

[ReNew Annual Integrated Report FY 2024-25 / India CSR 2025]

The Recognition That Followed the Results

TIME included Sumant Sinha on its 2024 TIME100 Most Influential Climate Leaders list, recognising his role in progressing India's clean energy transition and contributing to the global shift to a low-carbon economy. [TIME100 Climate 2024 / Business Wire, November 2024]

In 2025, Sinha was named to Forbes' Global Sustainability Leaders list. He has also received the 2022 USISPF Global Leadership Award, the Economic Times Entrepreneur of the Year 2018, and the EY Entrepreneur of the Year 2017. He is described as the first Indian business leader to be recognised as an SDG Pioneer by the United Nations. [ReNew Leadership Profile, ReNew.com / Sumant Sinha biography, sumantsinha.com]

At the World Economic Forum, Sinha co-chairs the Alliance of CEO Climate Leaders, described as the largest CEO-led alliance on climate action globally. In 2025, he was appointed Chair of the CII Energy Transition and Hydrogen Council. He is a Fellow of the Indian National Academy of Engineering and a board member at IIT Delhi. He authored Fossil Free: Reimagining Clean Energy in a Carbon-Constrained World, a book that lays out his argument for why India's clean energy transition is economically inevitable, not merely environmentally desirable.

What The Gigawatts Don't Tell You

ReNew's record is exceptional. But the company operates in a sector with genuine accountability challenges that honest journalism requires acknowledging. Large-scale solar and wind projects require significant land. Land acquisition processes in India have documented histories of displacing communities, particularly in states where land rights for tribal and agricultural communities are inadequately protected.

ReNew has published its first Nature Risk Report for FY 2024-25, fully aligned with the Taskforce on Nature-related Financial Disclosures (TNFD)'s 14 recommendations. The report signals awareness of ecological impact beyond carbon metrics. [ReNew.com, Nature Risk Report 2024-25]

The company's social impact programmes report reaching over one million lives. These claims require the same rigour that is applied to energy output claims — verified, independently assessed, and tied to specific, named communities and measurable outcomes. The ESG architecture that ReNew has built is more sophisticated than most Indian companies of any sector. It is not yet at the standard that a company with its international profile and capital market

exposure should be held to.

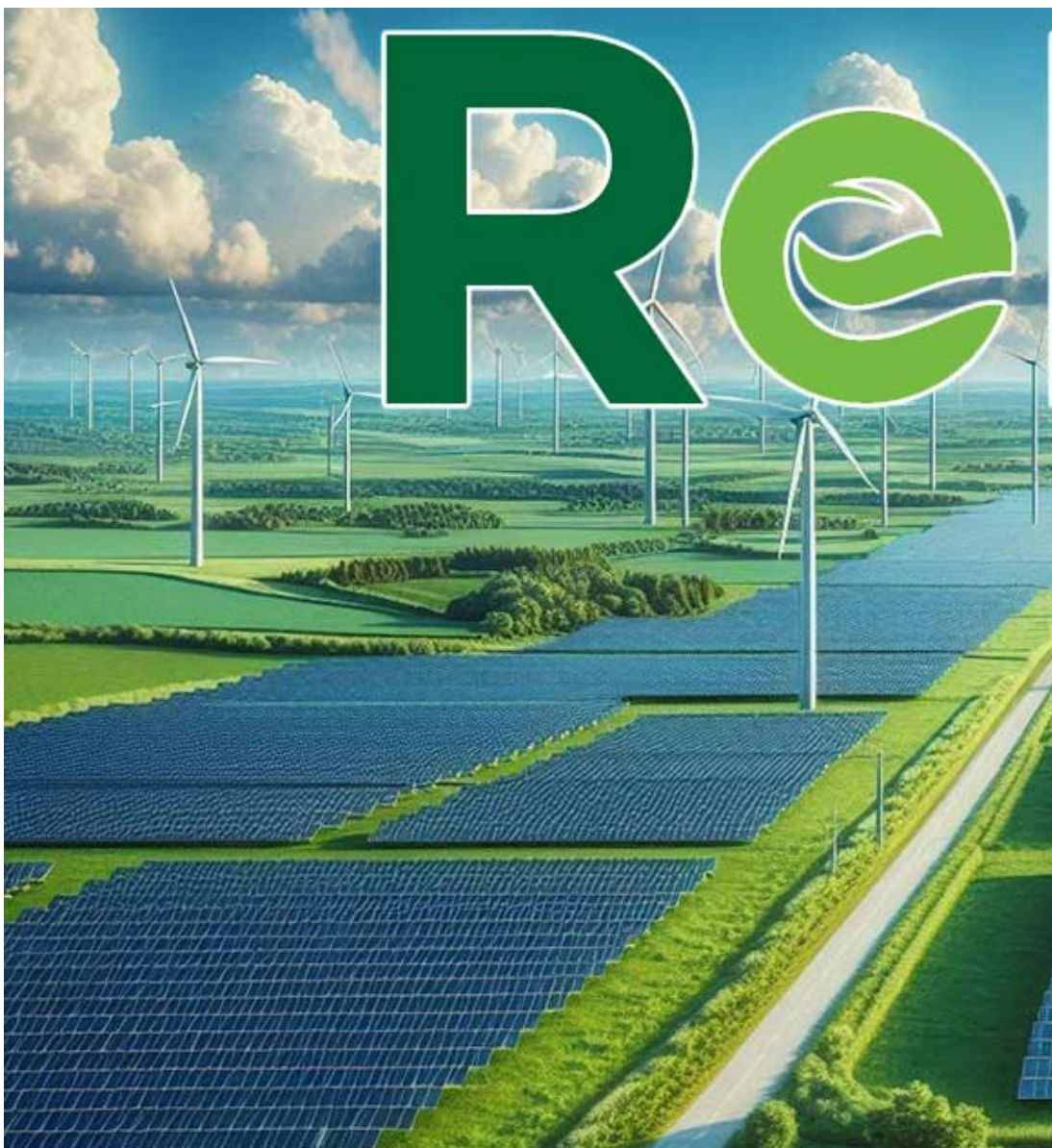
India's Energy Crossroads and the Role of Leaders Like Sinha

India's electricity demand is projected to grow 6.3% annually, with total consumption expected to double over the next seven years. Sumant Sinha has stated publicly that 70–80% of that increased demand will be met by renewable energy. [ANI / The Print, December 2024]

ReNew was the first Indian electric utility to be featured in the S&P

Global Sustainability Yearbook 2025, and has been ranked among the top seven renewable power companies globally by Morningstar Sustainability. [ReNew Annual Integrated Report FY 2024-25]

At stake in India's energy transition is not only a climate target. It is the economic model of the next fifty years. A country that builds its energy system on renewables, domestic manufacturing, and storage technology will look very different from one that remains dependent on imported fossil fuels. ReNew, under Sinha's leadership, has demonstrated that the private sector can be the velocity in that transition, not merely the compliance.



The Vision: From a Company to a Country's Future

Sumant Sinha founded ReNew in 2011 with a vision: to make clean energy commercially viable at scale in India. In 2025, as ReNew celebrates fifteen years, the original bet has been proven. The harder bet that a private company can be a structural force in a just, equitable, and ecologically responsible national energy transition is still being placed.

To make good on it, ReNew must hold itself to the standard that its ambition implies: transparent community impact data,

independently verified ecological assessments, and a commitment to ensuring that the communities nearest to its projects share in the prosperity the projects generate. The solar farm at Pokhran is India's largest. The field around it belongs to someone. That someone's relationship with ReNew should be as carefully designed as the panel arrays themselves.

The energy transition is real. The entrepreneur behind India's most significant private contribution to it is credible and accomplished. The work is not finished. It is, in 2026, at precisely the moment where getting the next decade right will determine whether the clean energy leap becomes a just

one. India will run on renewable energy. That argument is over. The argument that is just beginning and that ReNew's next decade will either answer or avoid is whether the people who live closest to those solar farms, wind turbines, and transmission lines will look back and say the transition was built for them too?





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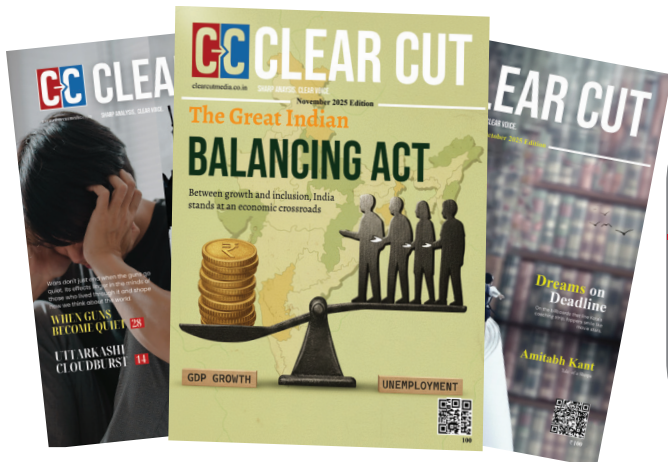
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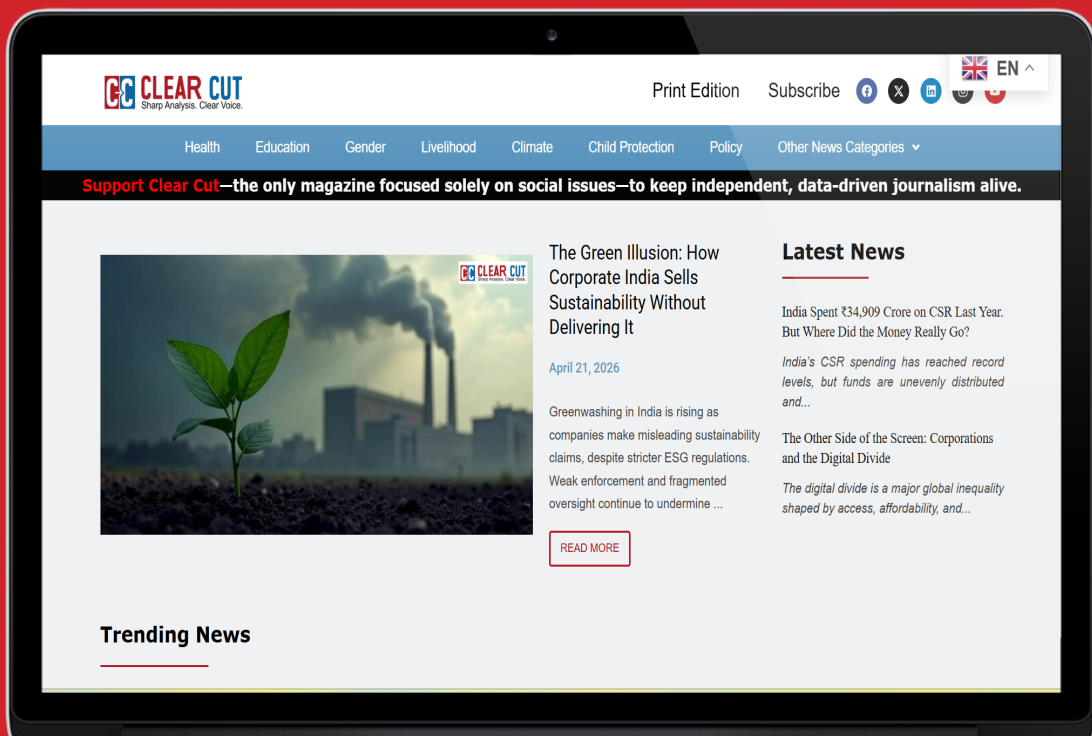
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