Shashwat

Volume 12 I Issue 12 I 2025

Let Nature Be

Innovate to Act for a Climate Resilient World

A **GRIHA Council** Publication

THANKS TO OUR VALUED PARTNERS

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Let Nature Be

Innovate to Act for a Climate Resilient World

GRIHA TIMELINE

2005-2007

- **2005**: TERI GRIHA released as an indigenous green building rating in India
- **2007**: MNRE adopts GRIHA as a National Rating System for Green Buildings

2008-2010

- **2008**: National Mission on Sustainable Habitat
- **2009**: Acknowledged as an innovative region-specific green building assessment tool by the UN
- **2009**: Committee of Secretaries: 3-star GRIHA rating mandatory for all government buildings
- **2009**: CPWD embraces GRIHA
- **2010**: Commencement of Evaluators' & Trainers' Programme

2011-2013

- **2011**: CREDAI
- **2012**: SVA GRIHA rating & GRIHA Product Catalogue
- **2013**: GRIHA LD rating
- **2013**: Launch of GRIHA App

2014-2016

- **2014**: GRIHA for Existing Day Schools rating
- **2015**: GRIHA v.2015 rating and GRIHA LD rating
- **2016**: GRIHA Help Centre, ACE membership & CATALYST Programme
- **2016**: MPPH & IDC, IICCI

2017

- **2017**: GRIHA for EB rating & GRIHA for AH rating
- **2017**: MPPH & IDC, PMC, BESTECH, IREO, Vatika, CONSCIENT, ADANI Realty, Vilas Javdekar Developers and Godrej Properties
- **2017**: EESL, NHB & ISHRAE
- **2017**: SPARSH installed at the UN office on UN Day

2018

- **2018**: PWD, Maharashtra
- **2018**: Orange County
- **2018**: Extended with NASA, India
- **2018**: Paryawaran Rakshak Programme for RWA
- **2018**: GRIHA Council felicitated with Green Excellence Award

2019

- **2019**: GRIHA v. 2019
- **2019**: GRIHA for Existing Day Schools Rating (version 2)

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GRIHA recognized as India's own green building rating system in **INDIA's INDC** submitted to the **UNFCCC**

- ❍ Launch/Events
- ■ Memorandum of Understanding (MoU)
- ★ Projects
- ◆ Awards and Recognitions

2022

- ❍ **2022**: NHB manual, SVA GRIHA V.3, JAN GRIHA, Decarbonizing Habitat Programme & GRIHA Water Positive certification
- ■ **2022**: Planning Insights, GEV, ICA, USG KNAUFF, Bhopal Smart City, NIUA, Sheffield Halam University, The 2000- Watt Smart Cities Association, Home First Finance Company India Limited & Life Insurance Corporation of India (LIC)

2024

- ★ **2024**: Successfully rated 350+ NVS schools
- ❍ **2024**: GRIHA Manual on Good Construction Management Practices
- ❍ **2024**: GRIHA Regional Conclaves in Lucknow, Hyderabad, and Jaipur
- ■ **2024**: BVDU College of Architecture, Pune; University of New South Wales (UNSW), Australia; Indian Institute of Architects (IIA), Uttar Pradesh Chapter; Institute of Indian Interior Designers (IIID), Lucknow Regional; Bangalore Metro Rail Corporation Limited (BMRCL); Vellore Institute of Technology (VIT); Indian Plumbing Association (IPA); ASHRAE Rajasthan Chapter & Fire & Security Association of India (FSAI)

2021

- ■ **2021**: IIFL HFL & Council of Architecture (Renewal)

2020

- ❍ **2020**: GRIHA Product Catalogue Brochure
- ■ **2020**: First Construction Council, EMC, CIMSME, KIIFB & IIA, Northern Chapter
- ❍ **2020**: Release of policy brief on Sustain the Sustainable Change

2023

- ■ **2023**: Navodaya Vidyalaya Samiti (NVS); Smart Surfaces Coalition (SSC); Natural Resources Defense Council (NRDC) & NASA India
- ❍ **2023**: Fast-track process for GRIHA Product Catalogue
- ◆ **2023**: GRIHA Council was awarded the 'Best National Brand of the Year' under the Solutions Category at the 6th edition of the GSBSA
- ◆ **2023**: GRIHA Council became network member of UNCTCN
- ❍ **2023**: GRIHA for Interior Spaces

2025

- ❍ **2025**: GRIHA Rating for Ports; GRIHA Infrastructure Rating for Highways; GRIHA v.6.0; Mindful Impressions: Targeting 2070 Workforce; Guide to Effective documentation; Whitepaper titled 'Scaling up Building Integrated Photovoltaics (BIPV) Applications in India'
- ❍ **2025**: GRIHA Regional Conclaves in Chandigarh, Guwahati, Bhubaneswar, Bengaluru, and Bhopal
- ■ **2025:** Kendriya Vidyalaya Sangathan (KVS), Ministry of Education, GoI; Indian Institute of Architects (IIA), Punjab Chapter; National Institute of Construction Management and Research (NICMAR) University; Indian Institute of Architects (IIA), Assam Chapter; Association of Architects, Assam (AAA); Siksha 'O' Anusandhan, University in Bhubaneswar; Chitkara University, Punjab; Fluxgen Technologies; Rajiv Gandhi Proudyogiki Vishwavidyalaya (RGPV), Bhopal; Ar. Rahul Shrikhande
- ◆ **2025:** Diverse GRIHA rating variants has been accepted by Global Real Estate Sustainability Benchmark (GRESB).

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MESSAGE FROM THE PRESIDENT, GRIHA COUNCIL

The world today stands at a decisive turning point, one where climate action must move from intent to implementation, with the built environment emerging as a catalyst for inclusive, resilient, and low-carbon growth.

This year's global convening of UNFCCC COP30 in Belém, Brazil focuses on reinforcing implementation and climate adaptation, urging nations to translate ambition into action through collaboration, multi-level governance, and localized access to climate finance.

As a nation, India's steadfast commitment to global cooperation is directed towards achieving a just, affordable, and inclusive energy transition, aligned with the Government of India's broader vision of 'One Earth, One Family, One Future'.

As a clean-energy frontrunner, India has achieved a major milestone in its transition journey by reaching 50% of its installed electricity capacity from non-fossil fuel sources, five years ahead of the target set under its Nationally Determined Contributions (NDCs) to the Paris Agreement.

Marching towards Amrit Kaal@2047 and the goal of becoming a net-zero emission nation by 2070, India is advancing a holistic vision that integrates industry transition, technological innovation, and behavioural change. Complementing this vision are transformative initiatives such as the PM Surya Ghar: Muft Bijli Yojana, Global Biofuel Alliance (GBA), Green Credit Initiative, and Mission LiFE (Lifestyle for Environment), each catalyzing a reform in mindset, behaviour, and lifestyle.

These efforts reflect India's unwavering journey towards climate resilience and sustainable development through the decarbonization of its economy.

India continues to champion the priorities of the Global South, advocating for equity, access to climate finance, technology partnerships, and capacity building. It remains a strong proponent of multi-level climate governance that empowers cities, regions, and communities while promoting decarbonized and inclusive growth.

With respect to the built environment, while buildings are major emitters of greenhouse gases, they are also key enablers of energy efficiency, circularity, and sustainable urban planning. This transformation becomes possible when governments, industries, academia, and civil society collaborate to mainstream climate-resilient infrastructure design and responsible lifestyles, turning sustainability into an everyday practice.

Policy frameworks such as the Energy Conservation Sustainable Building Code (ECSBC 2024) and the Eco Niwas Samhita (ENS) are together greening India's urban landscape, embedding efficiency, water security, and circularity within the built environment. Together, these provide a strong foundation for sustainable development that balances economic growth with ecological responsibility.

On this momentous occasion, I am pleased to announce the theme for the 17th GRIHA Summit and *Shashwat* 2025, Innovate to Act for a Climate Resilient Future. This theme is especially meaningful in the context of the evolving global climate discourse, reminding us that each of us has a role in shaping communities that endure, adapt, and thrive. This is the time to turn intent into impact.

The GRIHA Council continues to advance sustainable built environments through its robust rating systems, certifications, capacity-building initiatives, and continuous stakeholder engagement. Aligned with national priorities and evolving industry standards, GRIHA champions practical innovation in design, construction, and operations, helping practitioners navigate complexity with clarity and purpose.

Effective leadership remains indispensable in this endeavour. I extend my sincere appreciation to the 'Members of the Managing Committee of GRIHA Council' for their strategic guidance, and to the GRIHA leadership and team whose unwavering dedication continues to drive meaningful and measurable progress.

I express my gratitude to the various ministries and departments of the Government of India for their continued trust and confidence in GRIHA Council in spearheading the sustainable habitat movement across the nation and beyond.

I also wish to acknowledge the steadfast support of our partners, collaborators, and well-wishers, whose faith in GRIHA strengthens our shared mission.

With this collective resolve, I am confident that the GRIHA community will continue to shape spaces that transcend concrete and steel, spaces that embody resilience, environmental stewardship, and inclusion.

Let us continue to walk this path of innovation, inclusive design, resilient infrastructure, and sustainable lifestyles, reshaping the future we build together.

Warm wishes for a healthy, fulfilling, and prosperous New Year 2026!

Dr Vibha Dhawan
President, GRIHA Council and Director General, TERI

मनोहर लाल
MANOHAR LAL

आवासन और शहरी कार्य मंत्री एवं
विद्युत मंत्री
भारत सरकार
Minister of
Housing and Urban Affairs; and
Minister of Power
Government of India

It gives me great pleasure to know about the 17th GRIHA Summit and release of the GRIHA council's annual magazine, *Shashwat* - Let Nature Be. The chosen theme, "Innovate to Act for a Climate Resilient World," aptly underscores the urgent need for innovative and effective strategies to address the challenges posed by climate change.

The Government of India remains steadfast in its commitment to promoting sustainable development and holistic climate action through flagship initiatives and robust policies. The National Action Plan on Climate Change (NAPCC), with its eight core missions, including the National Solar Mission, National Mission for Enhanced Energy Efficiency, and the National Mission on Sustainable Habitat, reflects this comprehensive approach. Complementary programs such as the Smart Cities Mission, AMRUT, and Pradhan Mantri Awas Yojana (PMAY) further reinforce our resolve to transform India's urban landscape sustainably.

I am pleased to note the GRIHA Council's instrumental role in supporting government initiatives, especially through the integration of national policies and programs within its green rating framework. The GRIHA for Affordable Housing variant, aligned with the PMAY, is a good example of making sustainability accessible and inclusive.

My best wishes to the GRIHA Council team for the resounding success of the summit.

(Manohar Lal)

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ENVIRONMENT, FOREST AND CLIMATE CHANGE
GOVERNMENT OF INDIA

I am pleased to acknowledge the vital role that the GRIHA Council continues to play in advancing green building practices across the Nation. The organisation's commitment to promoting sustainability is commendable.

The theme of the 17th GRIHA Summit, "Innovate to Act for a Climate Resilient World", underscores the imperative that climate action must be forward-looking and rooted in innovation. This vision aligns closely with the Government of India's approach in driving systemic transformation through inclusive, scalable and environmentally responsible initiatives.

The Ministry of Environment, Forest and Climate Change, Government of India has implemented several landmark programmes to harmonise development with ecological integrity. The Green Credit Programme (GCP) introduces a market-based framework that rewards voluntary environmental actions, including sustainable construction, directly supporting the ethos of green building. Complementing this, the Eco-mark Certification Rules (2024) encourages environmentally friendly products, reinforcing the principles of the Lifestyle for Environment (LiFE) movement.

I am pleased to note that GRIHA Regional Conclaves held in various cities of India, have decentralised the sustainability dialogue, enabling state and local bodies to implement green building strategies tailored to their specific contexts, translating national climate goals into tangible action on the ground. I extend my best wishes to the GRIHA Council and the editorial team of Shashwat for their continued leadership and for creating a dynamic platform for knowledge-sharing and advocacy.

(Bhupender Yadav)

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ড° হিমন্ত বিশ্ব শর্মা
Dr. Himanta Biswa Sarma

সত্যমেব জয়তে

মুখ্যমন্ত্রী, অসম
Chief Minister, Assam

It gives me immense pleasure to extend my warm greetings and best wishes to the GRIHA Council on the occasion of the 17th GRIHA Summit, being organized on 3–4 November 2025 on the inspiring theme, "Innovate to Act for a Climate Resilient World."

Over the years, the GRIHA Council has played a pioneering role in promoting sustainable habitats through its robust framework for assessing the environmental performance of buildings. By issuing GRIHA Rating Certifications for both new constructions and retrofits, it has significantly advanced the adoption of green building practices across the country.

This year's theme rightly highlights the urgent need for innovation and action to address climate challenges. As India moves toward sustainability and net-zero goals, platforms like the GRIHA Summit serve as catalysts for translating ideas into impactful solutions.

I commend the GRIHA Council for its outstanding contribution to sustainable architecture and environmental stewardship. I am confident that the summit will foster new ideas, technologies, and partnerships for a greener and more resilient future.

My best wishes for the success of the Summit and the continued progress of the GRIHA Council. I hope the annual magazine "Shashwat–Let Nature Be" furthers the mission of creating sustainable habitats for generations to come.

Dr. Himanta Biswa Sarma

CMS.7/2024/3291.
Dispur, 28 Ahin, 1432 Bhaskarabda
October 15, 2025

DR. PRAMOD SAWANT
CHIEF MINISTER, GOA

I am pleased to commend the GRIHA Council for its continuous efforts to promote sustainable development in India. The 17th GRIHA Summit and the release of the annual magazine "Shashwat: Let Nature Be" provide valuable platforms to share ideas, discuss innovations, and encourage collective action for a greener and more climate-resilient future.

The theme for this year "Innovate to Act for a Climate Resilient World" reflects Goa's own vision of harmonising progress with environmental protection. Our state has always worked to balance growth with sustainability by promoting electric mobility, renewable energy, sustainable fishing, eco-friendly tourism, and biodiversity conservation.

The Government of Goa has also partnered with The Energy and Resources Institute (TERI) to strengthen climate resilience, protect coastal and marine ecosystems, and promote sustainable agriculture. A key initiative under this collaboration is the revival of Goa's traditional Khazan fields a unique, community-based farming system that supports both livelihood and ecological balance.

We are also working to make tourism in Goa more eco-friendly and to advance green solutions in shipping, renewable energy, and infrastructure. Under the Clean and Green Goa vision, the state is taking active steps to manage waste, phase out single-use plastics, restore mangroves, and expand solar power use.

I extend my best wishes to the GRIHA Council for the success of the 17th GRIHA Summit and Shashwat: Let Nature Be.

(Dr. Pramod Sawant)
Chief Minister, Goa

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Ashish Khanna
Director General

Message from the Director General, International Solar Alliance for Shashwat- Let Nature Be, GRIHA's Annual Magazine on the occasion of the 17th GRIHA Summit

The accelerating pace of climate change has intensified the twin challenges of rising temperatures and unequal access to sustainable energy. Across the Global South, countries now face the urgent task of building resilience to heat stress while pursuing inclusive economic growth. Solar energy stands at the intersection of these priorities — as both a climate solution and a catalyst for equitable development. In the first half of 2025, the world generated more electricity from renewables—especially solar—than from non-renewable sources for the first time on record. It took 25 years for global solar capacity to reach 1,000 GW, yet in just the last two years capacity has increased by another 1,000 GW. Over the next fouir years, the renewable installations are expected to increase by 4500 GW and 80% of this expansion is contributed by solar energy. With urbanisation accelerating rapidly, solar will be a pivotal technology in meeting future energy demand while reducing carbon emissions.

At the International Solar Alliance (ISA), we believe that solar technologies must be woven into the fabric of our daily lives — in how we plan, build, and inhabit our cities. With nearly 70% of Africa's buildings yet to be constructed by 2040 and India's built environment projected to drive half of the nation's electricity demand growth by 2050, integrating solar through Building Integrated Photovoltaics (BIPV) and energy-efficient design presents a transformative opportunity. When backed by robust R&D, visionary urban planning, and enabling policy frameworks, this approach can redefine how we build for a more sustainable world.

ISA's evolving vision is anchored around four pillars — Catalytic Finance Hub; Global Capability Centre and Digitisation; Regional and Country Level Engagement; and Technology Roadmap and Policy. Together, these pillars form the foundation of our efforts to accelerate solar adoption and unlock new pathways for sustainable development across our 124 Member and Signatory Countries.

Through initiatives like the Global Solar Facility, ISA is introducing comprehensive risk mitigation mechanisms — including payment guarantees, insurance instruments, and first-loss capital — to mobilise private investment in solar projects, especially in heat-stressed and energy-poor regions. Meanwhile, the SolarX Startup Challenge continues to champion innovation, nurturing entrepreneurs who are advancing solar-powered cooling, irrigation, and cold storage solutions vital for climate resilience.

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/ International Solar Alliance | @isolaralliance

Capacity building remains central to ISA's mission. Our STAR-Centres and training collaborations with institutions such as Indian Institute for Technology Delhi are cultivating local expertise to design, install, and maintain solar systems — ensuring the long-term sustainability of solar ecosystems in Member Countries. The proposed Global Capability Centre, using a hub-and-spoke model connecting national centres of excellence, will further strengthen technical assistance and reduce dependence on fossil fuels.

The work of the GRIHA Council aligns closely with this vision. By mainstreaming green building design and integrating renewable energy, GRIHA has demonstrated how architecture and energy policy can converge to create sustainable, climate-adaptive habitats.

As we collectively strive for heat-resilient economies and low-carbon cities, the synergy between solar integration and sustainable building frameworks will be pivotal. Together, we can ensure that the cities of tomorrow are not only livable, but luminous — powered by the sun and built for resilience.

Warm regards,

Ashish Khanna
Director General
International Solar Alliance (ISA)

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सचिव
Srinivas Katikithala, I.A.S.
Secretary

भारत सरकार
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Government of India
Ministry of Housing and Urban Affairs
Sankalp Bhawan, New Delhi-110001

Cities are at the forefront of both challenges and solutions in the global fight against climate change. As India urbanizes rapidly, the **Ministry of Housing and Urban Affairs (MoHUA), Government of India**, has been steadfast in steering this growth towards resilience, inclusivity and sustainability.

The **Ministry** has undertaken several flagship initiatives to build sustainable habitats and climate-smart urban systems. **The Smart Cities Mission** emphasizes integrated, technology-driven development with green mobility: energy-efficient infrastructure and climate-responsive design. **AMRUT 2.0** focuses on universal access to safe water supply; efficient sewage management and enhanced green spaces, while the **Climate Smart Cities Assessment Framework (CSCAF)** guides cities in embedding climate resilience across sectors.

In this endeavor, the vision of **MoHUA** and the framework of the **GRIHA Council** are closely aligned. The **Ministry** has provided national policy direction through building instruments such as the **Energy Conservation Building Code (ECBC); Eco-Niwas Samhita (ENS)** and the **Energy-efficient Sustainable Building Code (ENSBC)**, laying the foundation for sustainable construction in India.

Beyond energy efficiency, **MoHUA** has championed **strategic climate and inclusive initiatives** such as the **CSCAF** and the **Climate Centre for Cities (C-Cube)**, which strengthen local capacity for climate action; heat action planning and water-sensitive urban design. Inclusivity is ensured through schemes like the **Pradhan Mantri Awas Yojana (PMAY)**, which makes urban housing accessible to all, while fostering integration of marginalized communities into the planning and development process. Together, these initiatives ensure that urban growth is energy and resource-efficient; adaptive to climate risks and socially inclusive creating cities that leave no one behind.

Contd.../2

I commend the **GRIHA Council** for its pivotal role in setting benchmarks for sustainable habitats and for complementing **MoHUA's** mission of shaping green, resilient and inclusive urban development.

I extend my best wishes for the release of the **12th edition of Shashwat** (GRIHA Council's magazine) and for the success of the **17th GRIHA Summit**. I am confident that the deliberations will inspire innovation and accelerate transformative action towards a climate-resilient urban India.

(Srinivas Katikithala)
Secretary
Ministry of Housing and Urban Affairs

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Dr. K.M. Abraham CFA
Former Chief Secretary to
Government of Kerala &
Former Whole Time Member, Securities
and Exchange Board of India (SEBI)

CHIEF EXECUTIVE OFFICER
Ex-Officio Secretary to Government
Finance (Infrastructure)

On behalf of the Kerala Infrastructure Investment Fund Board (KIIFB), I extend our warm felicitations for the 17th GRIHA Summit under the inspiring theme *"Innovate to Act for a Climate Resilient World"*. I also convey our hearty congratulations to the GRIHA Council on the release of its annual publication magazine, *"Shashwat – Let Nature Be."*

In this context, KIIFB likes to highlight that, we remain committed to financing essential public infrastructure across Kerala in critical sectors such as healthcare, education, transportation, energy, water supply and information technology . Our strategic approach to investment is firmly rooted in the principles of sustainability, with a focus on long-term viability and enhancing the quality of life for our people. By aligning with globally recognized standards and frameworks, KIIFB has earned the trust of international development agencies and financial institutions.

Since the beginning of our association with the GRIHA Council in 2021, KIIFB has actively promoted the integration of sustainable practices into infrastructure planning and execution. The adoption of the GRIHA rating system has been instrumental in facilitating the construction of energy-efficient, environmentally responsible buildings across the State. As of September 2025, KIIFB has approved funding for about 1,180 projects worth Rs. 89,941 crores, many of which incorporate GRIHA's green building standards. This alignment has greatly strengthened our efforts to ensure that Kerala's infrastructure is both ecologically attuned and resilient.

The GRIHA Summit is a commendable initiative that reflects the GRIHA Council's unwavering dedication to advancing sustainable development and climate-conscious practices. By convening policymakers, industry leaders, innovators and thought leaders, the GRIHA Summit provides a vital platform for knowledge exchange, dialogue and the dissemination of best practices. We are confident that the ideas and deliberations emerging from this platform will inspire meaningful progress and catalyse innovation in building a climate-resilient future.

Dr K M Abraham

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धीरज कुमार श्रीवास्तव
मुख्य अभियन्ता, विद्युत मंत्रालय एवं महानिदेशक, बीईई
Dhiraj Kumar Srivastava
Chief Engineer, MoP & Director General, BEE

ऊर्जा दक्षता ब्यूरो
(विद्युत मंत्रालय, भारत सरकार)
BUREAU OF ENERGY EFFICIENCY
(Ministry of Power, Government of India)

I extend my heartfelt congratulations to the **GRIHA Council** on the convening of the **17th GRIHA Summit**, themed ***"Innovate to Act for a Climate-Resilient World"***, and on the release of the 12th edition of **Shashwat – Let Nature Be** (GRIHA's annual magazine).

As the world confronts the urgent challenges of climate change, platforms like the **GRIHA Summit** play a vital role in bringing together diverse stakeholders to foster dialogue, share innovations and advance sustainable solutions. **GRIHA Council** has been a forerunner in promoting sustainable building practices in India, setting benchmarks for resource-efficient construction and I commend its continued leadership in catalyzing climate-responsive development.

The **Bureau of Energy Efficiency (BEE), Ministry of Power, Government of India**, remains fully committed to furthering the nation's transition to a low-carbon economy. Our efforts are focused on institutionalising energy efficiency services, accelerating the adoption of advanced technologies and supporting India's climate commitments under the Paris Agreement and COP26 all while ensuring sustainable economic growth.

In pursuit of these goals, **BEE** has launched a range of flagship programmes like: (i) Perform, Achieve and Trade (PAT) scheme for energy-intensive industries; (ii) the Standards & Labelling (S&L) Programme for appliances; (iii) the implementation of the Energy Conservation Building Code (ECBC) and most recently, (iv) the release of the Energy Conservation and Sustainable Building Code (ECSBC) to further enhance energy performance and sustainability in buildings. Complementing these are initiatives in Demand Side Management (DSM), targeted support for MSMEs and close collaboration with State Designated Agencies (SDAs) to build capacity at the state level. The recent launch of the Carbon Credit Trading Scheme marks another milestone introducing a market-driven mechanism to reward industries for reducing emissions and adopting clean technologies.

The synergies between India's regulatory frameworks and voluntary green building standards are central to embedding energy efficiency and sustainability in our urban development agenda.

We look forward to continued collaboration with the **GRIHA Council** and wish the **17th GRIHA Summit** every success in inspiring meaningful action towards a climate-resilient future.

(Dhiraj Kumar Srivastava)

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It is my privilege to extend heartfelt congratulations to the **GRIHA Council** on the occasion of the **"17th GRIHA Summit"**, convened under the inspiring theme ***"Innovate to Act for a Climate Resilient World,"*** and on the publication of its annual magazine ***'Shashwat – Let Nature Be'***. This landmark initiative reflects the **GRIHA Council's** enduring commitment to advancing sustainability in India's built environment by convening leaders and stakeholders to foster dialogue, innovation and knowledge exchange.

Over the years, **GRIHA Council** has emerged as a pioneering institution in the sphere of green buildings and sustainable urban development. Its robust, indigenous rating framework uniquely harmonises global environmental aspirations with India's socio-economic and climatic realities. Through its sustained efforts, **GRIHA Council** has significantly influenced policy, informed design practices and fostered a culture of environmentally conscious construction across the country.

At **NBCC (India) Limited**, sustainability is not merely an aspiration, but a guiding principle. As a **Navratna Central Public Sector Enterprise** under the **Ministry of Housing and Urban Affairs (MoHUA), Government of India (GoI),** we have consistently integrated green building features such as energy efficiency, rainwater harvesting, solar energy utilisation and responsible waste management across our projects.

Our alignment with **GRIHA** standards is well reflected in several landmark developments: the redevelopment of **East Kidwai Nagar in New Delhi**; the **AIIMS campuses at Nagpur and Kalyani executed by our subsidiary HSCC**; and the **Vigyan Bhawan Annexe Extension, New Delhi**, which proudly earned the prestigious **GRIHA 5-Star Rating**. We are also honoured that the **Integrated Exhibition-cum-Convention Centre (IECC), Bharat Mandapam**—venue of the G20 Summit 2023—was awarded a **GRIHA 4-Star Rating** for its sustainable infrastructure. Many other buildings executed by NBCC are GRIHA certified as the company is committed towards the target of the country achieving Net Zero by 2070.

In an era where rapid urbanisation brings pressing ecological challenges, the theme of this year's **GRIHA Summit** is both timely and profound. It reminds us of our collective responsibility to ensure that progress and preservation advance hand in hand, shaping a built environment that complements and coexists with nature.

I commend the **GRIHA Council** for its visionary leadership in this vital domain and look forward to continued collaboration in shaping a greener, more resilient future for our nation. I wish the **17th GRIHA Summit** a great success and **Shashwat** a wide and meaningful readership.

K. P. Mahadevaswamy
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VICE PRESIDENT AND CHIEF EXECUTIVE OFFICER, GRIHA COUNCIL

As the world continues to face the mounting impacts of climate change, the need for transformative and actionable innovation has never been more pressing. The theme 'Innovate to Act for a Climate Resilient World' for this edition of *Shashwat – Let Nature Be* and this year's 17th GRIHA Summit remind us that creativity and commitment must converge to shape a sustainable future. Innovation is no longer confined to technology or design; it encompasses new ways of thinking, collaborating, and implementing solutions that balance human aspirations with ecological boundaries.

Over the years, GRIHA Council has worked towards redefining sustainability in India's built environment through adaptive frameworks and forward-looking initiatives. From developing contextually relevant rating systems such as GRIHA for Affordable Housing (AH) and Jan Awas Nirman (JAN) GRIHA, to launching performance-based certifications like Water Positive, Energy Positive, Net Zero Waste, etc. To augment sustainable development, GRIHA Infrastructure Rating that comprises independent tailored requirements for highways, ports, and metro stations, with others in pipeline, exemplifies sustainable practices being implemented across diverse sectors. These efforts showcase our belief that meaningful change emerges when knowledge, policy, and practice intersect. GRIHA Council continues to support solutions that addresses India's unique development challenges. These efforts showcase our belief that meaningful change emerges when knowledge, policy, and practice intersect.

GRIHA Council continues to emphasize the importance of education and awareness in shaping a climate-resilient future. Building on this conviction, we have undertaken extensive initiatives with Jawahar Navodaya Vidyalayas (JNVs) and Kendriya Vidyalayas (KVs) across the country. Through these programmes, we aim to nurture environmental stewardship among students and educators by sensitizing them to sustainable practices within their campuses and communities. In the process,

these school campuses are also evaluated on various parameters of sustainability. By engaging with future generations, we aim to create informed citizens who can champion sustainable lifestyles and influence collective climate action.

In addition to these outreach efforts, GRIHA Council has also been publishing a range of knowledge resources that aid the adoption of sustainable building practices across diverse contexts. Recognizing India's linguistic and cultural diversity, these resources are being translated and disseminated in regional languages to enhance accessibility and deepen the understanding of sustainability principles at the grassroots level. This initiative aims to empower local practitioners, students, and communities to integrate sustainable practices within their built environments, thereby broadening GRIHA's outreach and impact.

Moving closer towards meeting national and global sustainability goals, and envisioning Viksit Bharat 2047, the integration of innovation into every stage of planning, design, and construction becomes vital. The transition to a climate-resilient future demands that we harness the power of data-driven insights, low-carbon materials, circular economy principles, and nature-based solutions. Yet, true resilience goes beyond infrastructure; it lies in fostering awareness, empowering communities, and enabling systems that can adapt and thrive amid uncertainty.

The GRIHA Summit has always served as a platform to bridge policy, research and implementation, enabling a community of professionals, policymakers, and students to exchange ideas and co-create solutions. Our annual initiatives like conducting regional conclaves, training programmes, green building tours, policy collaborations, and the GRIHA Summit reflect this collective spirit of action. Each engagement reinforces the importance of partnerships that translate innovation into measurable climate impact.

Our dialogues at the Summit also serve as a platform for initiating deliberations that feed into global discussions at COP30, where GRIHA Council will be curating two focused sessions at The Solar Hub, one on Powering Buildings of Tomorrow: Scaling Renewable Interventions and another on Cooling Cities for a Hotter World: Strategies for Urban Resilience, driving innovations to advance the climate agenda.

As we look ahead, the responsibility to act decisively is both urgent and shared. Let us continue to innovate with purpose, design with empathy, and build with resilience. Together, we can ensure that sustainability remains not just an aspiration, but an achievable reality for generations to come.

I take this opportunity to convey my sincere gratitude to the members of the Managing Committee of GRIHA Council for their continued guidance and support in steering the initiatives of the organisation. I also extend my deep appreciation to our esteemed clients and associates across sectors, with whom we share enduring partnerships grounded in shared principles, values, and vision. Last, but not the least, I extend my appreciation to my ever-committed team for their unwavering support and hard work which have been instrumental in turning every critical project into a resounding success.

Sanjay Seth
Senior Director, Sustainable Infrastructure Programme, TERI and
Vice President and Chief Executive Officer, GRIHA Council

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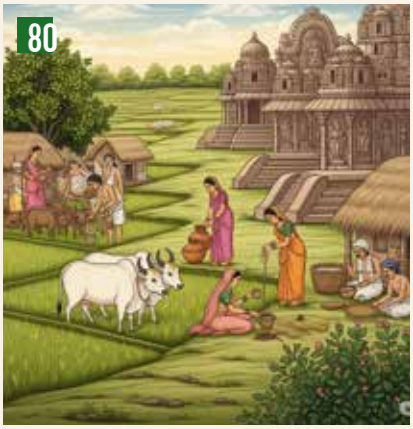

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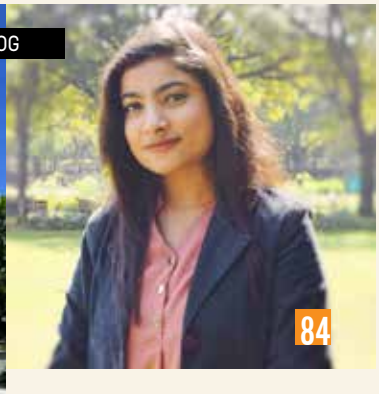

Climate Cost of Wanderlust: Rethinking bucket lists in a warming world

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Transforming The Skyline With Groundbreaking Vision, Precision & Innovation

Since the last 12 years, Elan Group has stood as a revolutionary force in the Indian Real Estate Sector, emerging as the Largest and Most Iconic Developer in Gurugram. Since its inception, Elan has shattered industry benchmarks with groundbreaking developments that epitomize luxury, innovation and sophistication.

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The first four projects are already fully operational, delivering the apex of luxury high-street retail, world-class dining and immersive entertainment experiences that set new standards in excellence. The remaining six projects, grandly launched and currently under construction, promise to elevate the benchmarks of urban sophistication. Furthermore, more visionary developments are in the pipeline, cementing Elan's reputation as a trailblazer in India's luxury real estate sector.

Every Elan project is a masterpiece, meticulously designed to cater to the aspirations of the most discerning clientele. With each launch, the Group surpasses expectations, reinforcing its reputation as a leader in luxury real estate.

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Elan's vision of "Building the Future" drives its relentless pursuit of excellence. By integrating advanced technologies and sustainable practices, the Group creates developments that are not only luxurious but also at the forefront of modern architecture and urban design.

In a world where expectations constantly evolve, Elan Group leads the charge, transforming Gurugram's skyline and shaping the future of ultra-luxury living. With an unparalleled track record and a mission to continuously innovate, Elan Group stands as a leader in India's luxury real estate landscape, crafting destinations that set new benchmarks for excellence.

Building Climate-resilient Anganwadis and Childcare Centres

Why India's anganwadis must go climate resilient

In India, children in the age range of zero and six spend a substantial time of their day in childcare centres. These havens provide a vital support system and therefore a safe environment for its occupants is a prerequisite. Ironically, this prerequisite is often neglected. This article narrates the plight of those children who are deprived of even basic rights of care and sanitation. Penned by **Dr Ipshita Mitra**, the text makes us comprehend how resilient early childhood care centres must go beyond bricks and mortar and effectively contribute towards a child's physical, emotional, and cognitive development during this critical period.

Dr Ipshita Mitra

is Manager–Communications and Publications, TERI. She is a communications and editorial specialist with over 14 years of experience spanning journalism, publishing, and sustainability-focused content development. She has contributed to leading national media platforms.

According to the Ministry of Women and Child Development, there are 13.99 lakh (K Jha 2025) operational anganwadi centres (AWCs) across India, as of March 2025. Many of these centres and creches for children are usually housed in rented rooms, makeshift shelters, or community halls. Often considered one of the first public institutions children encounter, these spaces are designed to provide nutrition, early learning, and basic health care. However, most of these centres are not designed for climate resilience.

In the era of unprecedented weather events, especially heatwaves, it is time to rethink this first stage of India's public infrastructure. A resilient early childhood care centre must go beyond bricks and mortar. It must shield, soothe, and support. This is a space where children aged zero to six spend the most formative hours of their day. Yet, across India, the buildings meant to nurture them are ill-equipped to protect them from the country's intensifying heatwaves.

Under the Poshan Tracker data, efforts are underway to co-locate anganwadis that currently operate on rented premises into primary school buildings. This indicates that several childcare centres remain in rented rooms or temporary shelters. As part of the recommendation, co-location of AWCs with schools, wherever feasible, should be pursued proactively through collaboration between integrated child development services (ICDS), gram panchayats, and education departments. Uttar Pradesh offers a promising example in this regard, nearly 60% of its AWCs are co-located with schools, compared to an all-India average of just 18% (Joe and Subramanyam 2020).

Strengthening Policy Frameworks

India's Poshan 2.0 and Saksham Anganwadi programmes aim to upgrade infrastructure in child development services. However, climate resilience and thermal comfort are seldom part of the conversation. These programmes often prioritize hygiene, service delivery, and nutrition, while overlooking an increasingly urgent dimension: thermal comfort and structural resilience in the face of extreme climate conditions.

As per the 2025 World Bank Guidance Note on quality childcare settings, one of the five foundational checks poses questions, such as:

> "Is the setting reasonably safe and structurally conducive to learning and development? Are there exits, airflow, light, heat, and rain protection? Would the temperature be okay in another season?"
>
> **Kelly and Beaton-Day 2025**

A National Anganwadi Infrastructure Assessment (2014–15) (Ministry of Women and Child Development 2015) reported that several centres in Delhi are located in old buildings; these suffer from leaking roofs, poor lighting, and inadequate ventilation, thereby indicating a compromised physical environment. In some Delhi-NCR anganwadis and creches especially those operating from tin sheds, asbestos roofs, or non-ventilated rooms the answer to most of the questions as raised in the 2025 World Bank report discussed previously is a worrying 'No'.

A household study of low-income homes in Delhi and other cities found that 22% of Delhi (Tasgaonkar, Zade, Ehsan, *et al.* 2022) dwellings had metal-sheet roofs, experiencing indoor summer temperatures higher than outdoors directly implicating tin roof structures in heat stress. Such spaces can therefore not only disrupt early learning but pose serious health risks dehydration, fatigue, poor concentration, and in extreme cases, heatstroke. In a city like Delhi, especially, where heatwaves tend to stretch for weeks, the conditions are critically concerning for under-five-year-olds, who are more vulnerable to heat stress than adults.

"Physiography needs to be factored in guidelines and protocols for anganwadis, which should be done at sub-national levels, and fine-tuned at the district level," suggests Ms Neelam Singh, Executive Director of HAQ: Centre for Child Rights, highlighting the need for context-specific, climate-responsive design mandates.

"Based on available information, I am of the view that the public infrastructure policy framework does not factor in climate resilience, especially in childcare or early learning spaces," asserts Ms Singh. On whether there are any current mandates embedded in flagship programmes, she adds: "Not that I know of."

Such an oversight can have serious consequences. Not just for the physical comfort of children, but also for their long-term cognitive and emotional development.

Designing Climate-resilient Childcare Spaces

For a holistic development of children, the public spaces built for them must be cognizant of certain design or architectural decisions, shading, orientation, local materials which can go a long way in ensuring an effective and sustainable environment for

children. For instance, creches can have bamboo-thatched awning at the entrance, which shades the room throughout the day. The walls could be coated with lime plaster, a breathable material that cools naturally. Cross-ventilation could be built into the structure through high-set vents and operable windows on either side.

As mentioned previously, children who are below six years old are among the most vulnerable, physiologically, to climate-induced stress, especially in overcrowded, poorly ventilated spaces. Globally, over 559 million children (UNICEF 2023) are exposed to frequent heatwaves, as per UNICEF. High indoor temperatures can lead to a range of health effects, including:

- Loss of appetite
- Increased risk of respiratory infection
- Reduced attention span
- Frequent absence

"At this juncture, (the idea of ensuring thermal comfort) seems to be a pipedream," Ms Singh notes. "Infrastructure would have to be upgraded; maintenance and energy requirements would have to be provided for," she adds.

On the policy front, Ms Singh emphasizes, "Ecologically sustainable infrastructure creation, maintenance and usage protocols as well as disaster mitigation plans which are developed at sub-national levels and fine-tuned during implementation at the district levels, adequate financial resource allocation, and quality assurance processes/audits" are essential shifts to protect young urban citizens. She further stresses the need for "orientation of frontline workers, ongoing conversations with parents, caregivers, and local communities" as key governance levers in embedding climate responsibility.

Low-cost Design Interventions

So, what should a climate-resilient childcare centre look like? Listed below are a few practical and scalable solutions for childcare settings in heat-prone regions like Delhi-NCR. Such low-cost adaptations that can be replicated widely include:

- Cool roof treatments (white paint, lime plaster, insulation boards)
- Shaded verandas or bamboo awnings
- Cross-ventilation and operable windows
- *Jali* walls or perforated bricks for filtered airflow
- Orientation that avoids harsh sun exposure, for example, a north–south building layout, narrow floor plans, and optimized window placement

can enhance ventilation, as recommended in passive building design guidelines

- Planting trees or creepers for natural shading
- Non-metal roofing (use clay tiles or fibre cement sheets instead)

However, Ms Singh points out a hard reality: "Administrations prefer to shut down the schools, etc.," during extreme weather events rather than invest in adaptive infrastructure.

Looking Ahead

These centres are where parents trust the state with their children. Therefore, such spaces must reflect care, safety, and climate preparedness.

In Kerala's Moodadi panchayat (The New India Express 2024), over 30 anganwadis are being upgraded with cool roofs and energy-efficiency measures, under a local heat-resilience plan developed with the state disaster management authority. In Kasaragod, a community-driven effort installed 2 kW (Onmanorama 2024) rooftop solar panels on an anganwadi, making it energy-efficient. These initiatives show that sustainability can—and does, begin at the grassroots, not just in elite schools or smart cities.

In future, India's children will live through some of the hottest decades on record. Ensuring their first public buildings are resilient to climate stress is no longer optional, it is urgent and essential. If a school is where the mind is trained, a creche or a childcare centre is where the body learns to adapt to space, structure, and routine. The temperature of that room matters.

"They must," Ms Singh avers, when asked if climate justice frameworks in India adequately consider children's well-being especially for those in urban poor settings. "We are trying to look at state government policies and action plans to get a better sense of their priorities in terms of children in urban poor neighbourhoods."

Climate justice begins at home.

References

Jha, S. 2025 (12 March). Over 2 lakh vacancies at Anganwadi centres: Centre tells Parliament. Hindustan Times. Details available at <https://www.hindustantimes.com/india-news/over-2-lakh-vacancies-at-anganwadi-centres-centre-tells-parliament-101741789751818.html>

Joe, W and M Subramanyam. 2020 (February). Evaluation of ICDS scheme of India. Institute of Economic Growth. Details available at <https://www.niti.gov.in/sites/default/files/2023-03/Evaluation%20of%20ICDS%20Scheme%20of%20India.pdf>

Kelly, M and F Beaton-Day. 2025. *Guidance Note: essential elements of quality in childcare settings*; p.8. Washington, DC: World Bank

Ministry of Women and Child Development. 2015. National Anganwadi assessment 2014–15 [PowerPoint slides]. SlideShare. Details available at <https://www.slideshare.net/slideshow/national-aanganwadi-assessment-201415/48330013>

Onmanorama Staff. 2024 (26 July). 5 Young Climate Activists Raise Money to Set up Rooftop Solar System in Kasaragod Anganwadi. Onmanorama. Details available at <www.onmanorama.com/news/kerala/2024/07/26/young-climate-activists-set-up-rooftop-solar-system-kasaragod.html>

Tasgaonkar, P, D Zade, S Ehsan, G Gorti, N Mamnun, C Siderius, and T Singh. 2022. Indoor heat measurement data from low-income households in rural and urban South Asia. *Scientific Data* **9** (1): 285. Details available at <https://doi.org/10.1038/s41597-022-01314-5>

The New Indian Express. 2024 (19 February). Kerala: Moodadi on path to become state's 1st heat resilient gram panchayat. Details available at <https://www.newindianexpress.com/states/kerala/2024/Feb/29/kerala moodadi on path to become states 1st heat resilient gram panchayat>

United Nations Children's Fund. 2023. Extreme heat. Children's Environmental Health Collaborative. Details available at <https://ceh.unicef.org/spotlight-risk/extreme-heat>


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The Impact of Pedestrianization on Urban Life

A walk towards sustainable cities

The article in hand sheds light on the positivity of pedestrianization. **Geeta Saha** aptly explains, pedestrianization is not merely about banning cars; it is about reimagining cities for people. With strategic planning, public participation, and smart infrastructure investments, pedestrian-friendly cities can thrive without disrupting urban mobility. As cities expand, prioritizing walkability will foster economic vitality, environmental sustainability, and social well-being, ultimately leading to a healthier and more vibrant urban future.

Geeta Saha

is Assistant Professor at DEI Agra, works at the intersection of sustainable design, green buildings, and architectural pedagogy. She is the recipient of Greenpreneur and Arcause SAaTh Design Educators Awards.

In an era dominated by rapid urbanization, expanding flyovers, and increasing dependence on instant delivery services like Rapido and Zepto, the fundamental act of walking is often neglected. As Delhi NCR continues its trajectory of infrastructural expansion, the cityscape is becoming more car-centric, leading to congestion, environmental degradation, and declining public health. However, pedestrianization has emerged as a transformative urban strategy that can counterbalance these negative trends (Gehl 2010).

Historically, cities were built around pedestrian movement. Ancient Indian cities like Varanasi and Jaipur had narrow streets bustling with market activity, fostering a walkable environment. However, modern urbanization widened roads, prioritized cars, and reduced pedestrian-friendly spaces. Today, cities worldwide are reversing this trend, bringing back walkable spaces to create more vibrant and liveable urban centres.

Pedestrianization is the process of converting vehicle-dominated streets into pedestrian-friendly zones. This transformation is more than just eliminating cars; it represents a shift in urban planning philosophy. Cities that have embraced pedestrianization report improved economic growth, lower pollution, and enhanced public well-being. However, in a vast and diverse metropolis like Delhi NCR, pedestrianization poses challenges that require strategic solutions.

Challenges and Strategies for Effective Pedestrianization

Business adaptation and logistics

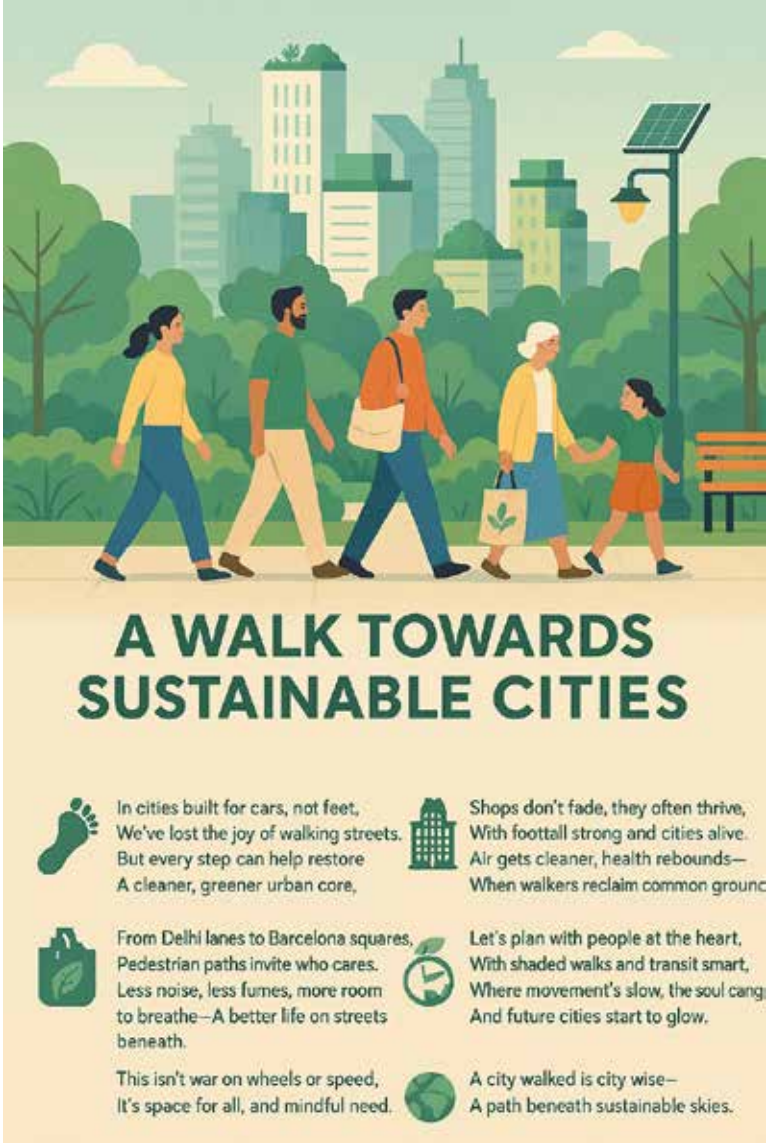
One of the primary challenges of pedestrianization is the impact on businesses that rely on vehicular access for deliveries. Cities can implement dedicated loading zones, time-restricted vehicle access, and micro-consolidation centres using cargo bikes to ensure smooth operations without disrupting walkability.

- Chandni Chowk redevelopment: Traders faced disruptions due to restricted vehicle access, leading to designated loading/unloading zones (Bhat, Verma, and Nanda 2021).
- Barcelona's micro-consolidation centres: Small logistics hubs facilitate seamless last-mile deliveries via cargo bikes, mitigating congestion while maintaining efficiency (Mueller, Rojas-Rueda, and Nieuwenhuijsen 2020).

Traffic Redistribution

- Restricting vehicles on key streets can cause traffic congestion if alternative transit isn't provided.
- Jakarta's Sudirman pedestrianization led to bottlenecks on parallel roads due to the absence of simultaneous public transport expansion (Marshall 2018).

Solutions include expanding public transport, developing park-and-ride systems, and dynamic street designs allowing off-peak vehicle access.



Accessibility and Public Transport Integration

Ensuring accessibility is critical for the success of pedestrianization projects. Strategies include barrier-free streets, integration with metro and bus networks, and shared mobility options.

- Delhi Metro expansion will make 80% of Delhiites within 400 metres of a station, enabling walkable commuting (Frank, Sallis, Conway, *et al*. 2010).
- Singapore's time-restricted delivery access ensures balanced mobility in pedestrian zones during off-peak hours (Gehl 2013).

Strengthening public transport links and integrating pedestrianized areas with metro and bus services are key strategies for successful pedestrianization in Delhi NCR.

Environmental Benefits of Pedestrianization

Improved air quality

Delhi's air pollution, primarily due to vehicular emissions, can be reduced by pedestrianization. A significant effort towards reducing vehicular congestion in Delhi was the Odd–Even policy, which led to a measurable reduction in air pollution. A study conducted during the implementation of the scheme recorded a 10–13% reduction in $PM_{2.5}$ levels and improved travel times. Barcelona's superblocks, where vehicle access is restricted, showed a 33% reduction in nitrogen dioxide levels (Mueller, Rojas-Rueda, and Nieuwenhuijsen 2020).

Reduced carbon footprint

Pedestrian-friendly policies in Oslo achieved near-zero pedestrian fatalities and reduced transport emissions, contributing to a lower carbon footprint (Marshall 2018). In Delhi NCR, pedestrianization could decrease carbon emissions in areas like Cyber Hub, Hauz Khas, or Lajpat Nagar.

Lower noise pollution

Pedestrianized streets reduce noise pollution, which negatively impacts mental health and well-being. Reducing vehicular access in congested Delhi areas like Nehru Place or Khan Market could also reduce noise pollution (Miedema and Vos 2007).

Economic and Social Benefits of Pedestrianization

Boost in commercial activity

Pedestrianization doesn't harm businesses; it boosts sales.

- Bengaluru's Church Street pedestrianization led to a 25% surge in foot traffic and sales for cafes and retail (Bhat, *et al.* 2021).
- London's Oxford Street saw a significant increase in retail sales after becoming pedestrian-friendly (CABE 2007).

Pedestrianized areas attract tourists, creating job opportunities in retail, hospitality, and urban maintenance.

- Paris' Seine River pedestrianization transformed former roads into cultural hubs, attracting more tourists (Gehl 2013).
- Delhi's Connaught Place pedestrianization on weekends transformed it into a cultural and economic hub, drawing crowds for live performances and street markets (WHO 2018).

Expanding pedestrianization in historical districts like Chandni Chowk, Mehrauli, and Qutub

Complex can bolster Delhi NCR's tourism sector and foster economic development.

Reduction in Infrastructure and Health Care Costs

Cities prioritizing cars require substantial infrastructure investments, while pedestrianized areas are cost-effective to maintain. Pedestrianization also reduces health care expenditures from air pollution and traffic accidents. Delhi experiences over 1,200 pedestrian fatalities annually, suggesting safer streets could prevent injuries and fatalities, relieving health care pressure (WHO 2018).

Recommendations for Successful Pedestrianization in Delhi NCR

Delhi's Master Plan 2041 prioritizes sustainable urban growth through mixed-use developments and enhanced public transportation. Pedestrianization should be integrated by designing safe, accessible walkways and reducing car dependency.

- Investment in pedestrian infrastructure: Developing high-quality pedestrian infrastructure encourages walking and enhances urban life.
- Regulation of rapid delivery services: Designate delivery zones, regulate operating times, and promote cargo bike deliveries to minimize conflicts between pedestrians and delivery vehicles.
- Data-driven decision making: Conduct comprehensive impact studies and implement adaptive mechanisms for real-time evaluation and improvements.
- Community engagement: Involve local residents and businesses in decision-making and transparent communication.
- Integrated urban design: Ensure seamless connections between pedestrian zones, public transport, and cycling networks.
- Universal accessibility: Design barrier-free spaces with tactile paving, ramps, and inclusive urban furniture for all users.

Conclusion: walking towards a sustainable future

Pedestrianization is not merely about banning cars; it is about reimagining cities for people. With strategic planning, public participation, and smart infrastructure investments, pedestrian-friendly cities can thrive without disrupting urban mobility. As Delhi NCR expands, prioritizing walkability will foster economic vitality, environmental sustainability, and social well-being, ultimately leading to a healthier and more vibrant urban future.

References

Bhat, C., A. Verma, and R. Nanda. 2021. Impact of pedestrianization on commercial activity in urban centres. *Journal of Urban Mobility* **15** (3): 45–58

Commission for Architecture and the Built Environment (CABE). 2007. The economic impact of pedestrianisation on retail businesses. London: CABE

Frank, L. D., J. F. Sallis, T. L. Conway, J. E. Chapman, B. E. Saelens, B. E., and W. Bachman. 2010. Many pathways from land use to health. *Journal of the American Planning Association* **72** (1): 75–87

Gehl, J. 2010. *Cities for People*. Island Press

Marshall, S. 2018. Urban Mobility and Public Space. Routledge

Mueller, N., D. Rojas-Rueda, and M. J. Nieuwenhuijsen. 2020. Health benefits of pedestrianized cities. *Environmental Research* **188**: 109748

World Health Organization WHO (2018). *Global Status Report on Road Safety 2018*. World Health Organization

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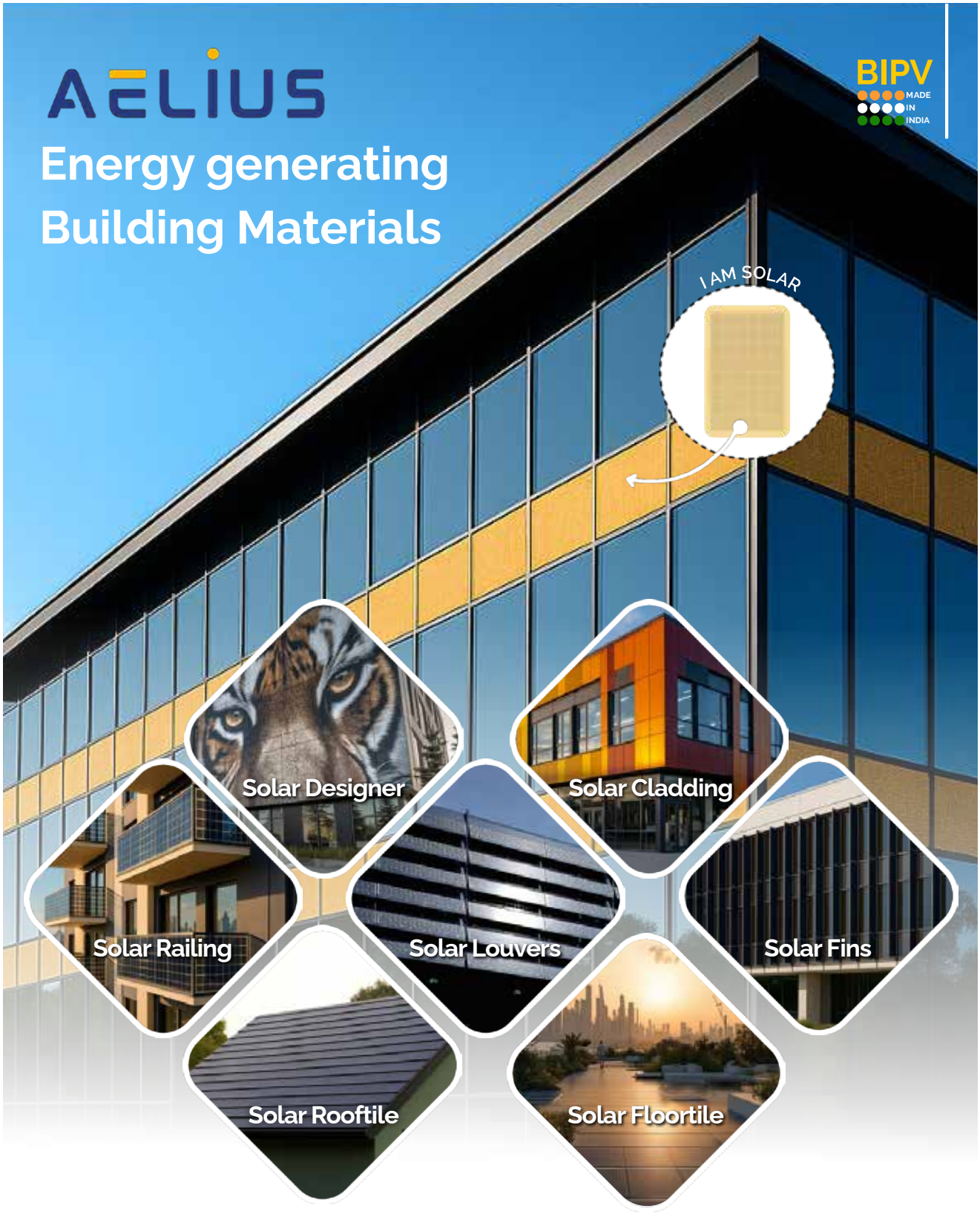

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Thermal Comfort Studies in the Fields,
Thermal Comfort Studies in the Air Fields,
Thermal Comfort Studies on the Roads,
Thermal Comfort Studies here, there,
everywhere...

But as the world keeps growing hot,
All our Thermal Comfort Studies come to nought.
We may study Thermal Comfort with all our might,
But all spaces indoor and outdoor face the Sun's scorching might.
Thermal Comfort Studies spanning all across,
Indoor, Outdoor, Transitional,
National and International,
In the Classrooms, In the halls,
In the Yoga-rooms, In the malls,
On the Meadows,
Even across the Town Boroughs,
Even within the Shadows....

Still, Thermal Dis-Comfort keeps increasing,
With all Anthropogenic heat that we are releasing.
As we recklessly devour more Energy,
And our cities and mother nature have no Synergy...
Thermal Dis-Comfort Here, There, everywhere...
Heat Stress, Heat Risk Index, Heat Wave Fatalities,
Are all part of day to day Calamities.

Should we not pause, take a deep breath,
And re think, taking one more deep breath,
As to why the all our studies on Thermal Comfort,
Are actually on ground doing nothing to stop the Ever Increasing Thermal Dis-Comfort?
And every passing year it keeps getting worse...
Is it a nature inflicted curse?
On humans for their Greed,
Without paying any Heed?

The Answer, My Friend, maybe blowing in the wind....

Dr Janmejoy Gupta
Associate Professor at School of Planning and Architecture, Vijayawada

Scents of Earth

When waste becomes a whisper of luxury

This piece of writing contributed by **Dr Ruchi Agrawal** and **Anushtha** makes us eyewitness of the implementation and execution of 'wealth from waste' in true means. The text elaborates how fragrances can be brewed from the waste. The authors have outlined in this new age, what once smelled like scrap now smells like hope. Together, innovators are proving that waste is no longer a waste—it's the future of fragrance. Luxury today isn't rare, it's regenerative.

Dr Ruchi Agrawal

is Fellow at TERI. She works on 'Agrowaste Biorefinery and Bioproducts Development'. She was a Fullbright- Kalam Climate Fellow for Professional and Academic Excellence at NREL, USA. Dr Agrawal also received Alexander von Humboldt Fellowship for Germany, DST-INSPIRE Fellowship, visiting fellowship for short-term research at University of Tennessee and Oakridge National Laboratory (ORNL), USA and was honoured with prestigious Governor Award at Rajbhawan in 2016 for PhD research.

Anushtha

is Biotechnology Postgraduate and Consultant at TERI. Her work focuses on sustainable innovations in biowaste valourization and green technologies. She has contributed to national-level projects involving lignin-based smart-release fertilizers and hydrogel-based seed coatings. Passionate about driving eco-conscious solutions, she aims to create meaningful impact through science-led sustainability.

What if the world's next iconic fragrance didn't emerge from a perfumer's lab but from your compost bin?

Wilted petals, citrus peels, coffee grounds, banana skins casually discarded, yet have untapped potential. What if these scraps held the power to be reimagined as treasures? From facials that glow with mango seed to fragrances brewed from citrus zest, nature's waste is being transformed into sensorial experiences.

But luxury today isn't rare; it's regenerative.

Welcome to the world where waste renews, nurture, and overturn outdated perceptions, revealing the potential hidden in what we once overlooked.

Image 1 *Not waste, but wonder. Everyday biowaste holds powerful potential waiting to be reclaimed*

Trash, Reimagined

Every year, over 1.3 billion tonnes of food is discarded across the globe (FAO 2021). Yet what we throw away isn't devoid of value; it's bursting with biochemical brilliance. Orange peels, spent tea leaves, and basil stems are packed with potent natural compounds, often more powerful than anything a synthetic lab can synthesize.

Limonene, found in citrus peels, is a vibrant, antimicrobial molecule known for mood-boosting properties and intoxicating zest (Gupta, Jeyakumar, and Lawrence 2021). Meanwhile, chlorogenic acid from coffee grounds is a rich antioxidant that revives dull skin (Her, Lee, Kim, *et al.* 2020). Even banana peels hide wound-healing properties, potentially higher than the rival store-bought ointments (Maulidya, Kanedi, Yulianty, *et al.* 2020).

Image 2 *Soxhlet extraction: reclaiming nature's hidden actives with lab-grade precision*

And the most fascinating part?

We are only just beginning to peel back the layers.

Advancements like enzyme-assisted fermentation, Soxhlet extraction, and cold-press distillation are making it possible to preserve these bioactive treasures. No more crude decoctions, lab-grade precision blended with botanical elegance.

The results? Skincare that heals, perfumes that seduce, candles that soothe, all born from yesterday's waste.

The Biowaste Renaissance

A bold wave of eco-entrepreneurs, green chemists, and indie formulators is reshaping the narrative of beauty and wellness. Not with exotic imports, but with backyard biodiversity.

In India, age-old ingredients like neem, turmeric, and clove often wasted in masses are being revitalized into plant-powered petcare blends and soothing fragrances. These aren't your grandmother's DIYs; they are elegantly crafted, pH-balanced formulations, scientifically stable and globally compliant while staying rooted in tradition.

Across Europe, grape pomace is being reimagined into resveratrol-rich serums (Castro, Ferreira, Pintado, *et al.* 2023), while florists upcycle leftover blooms into botanical waxes, letting forgotten florals burn bright once more. In South Korea, fruit peels become glass-skin elixirs glowing with microbiome magic.

Image 3 *Biowaste pioneers turning science into sustainability*

Image 4 *Upcycled lignin powering green scents*

In high-tech urban labs, scientists are extracting brilliance from pomegranate peels, tomato seeds, mango kernels, and even temple flower waste, proving that nature discards outperform synthetics in both efficacy and emotional impact (Oboturova, Povetkin, Nikulnikova, *et al.* 2024).

Lignin, once a paper mill by-product, is stealing the spotlight in luxury fragrance. Eurofragance's and Bloom Biorenewables transform it into aromatic compounds, reimagining scent from the forest floor up. Together, these innovators are proving that waste is no longer waste; it's the future of fragrance.

The New Vocabulary of Scent

Scent is primal. It transcends logic, roots into memory, and evokes emotion before words ever form. But until recently, our olfactory experiences were drenched in petrochemical derivatives, fragrances built in labs, stripped of soul, and laced with volatility.

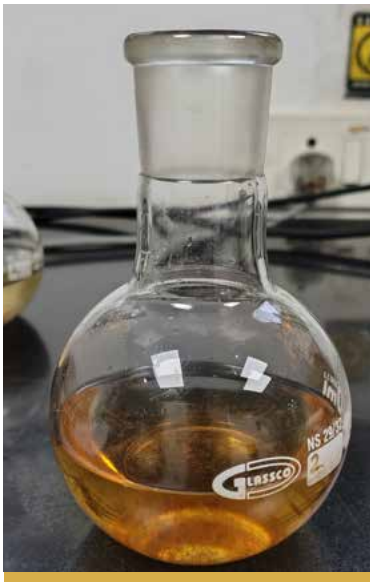

Image 5 *Bio-extract from waste peels in fragrance creation*

Now, the lexicon of scent is changing. Swapping synthetic musk for rose waste, replacing artificial citrus with cold-pressed orange oil, and choosing tea-scented scrubs from yesterday's café grounds. It's no longer about creating a fragrance that impresses but one that connects to Earth, to our senses, to each other.

This neo-luxury is tactile, traceable, and transparent. A diffuser labelled 'spent vetiver roots and distilled ginger peels' speaks louder than one labelled 'Fragrance No. 7'. It's not just clean; it's conscious.

The Future Smells Like Change

Of course, this fragrant revolution isn't without challenges. Natural extracts degrade quickly, vary seasonally, and require delicate preservation. Sourcing biowaste consistently requires synchronizing with farmers, florists, juice stalls, and temples. Regulations? Even tougher, especially when scaling to international markets.

Yet, innovation is blooming.

Eco-safe preservatives like sodium benzoate and potassium sorbate are extending shelf life without sacrificing sustainability (Dong, Yang, Zhang, *et al.* 2024). AI-driven extraction tech is maximizing yield while reducing waste. And most importantly, there is a growing call to forge partnerships with local waste generators to turn collection into a supply chain. Because the peel, the petal, the pulp; all have purpose. The world is waking up not to artificial aromas, but to stories infused in every scent. From compost to couture, the waste beneath our feet is rising in value.

In this new age, what once smelled like scrap now smells like hope.

References

Food and Agriculture Organization of the United Nations (FAO). 2021. *Food Waste Index Report 2021*. Rome: United Nations Environment Programme

Gupta, A, E Jeyakumar, and R Lawrence. 2021. Journey of limonene as an antimicrobial agent. *Journal of Pure and Applied Microbiology* **15** (3): 1094–1110

Maulidya, E, M Kanedi, Y Yulianty, and E Ernawiati. 2020. The effectiveness of ethanol extract in muli banana peels (*musa acuminata*) to heal cut wounds in mice (*mus musculus*). *Biosfer: Jurnal Tadris Biologi* **11** (1): 17–25

Her, Y, T K Lee, J D Kim, B Kim, H Sim, J C Lee, J H Ahn, *et al.* 2020. Topical application of aronia melanocarpa extract rich in chlorogenic acid and rutin reduces uvb-induced skin damage via attenuating collagen disruption in mice, *Molecules* **25** (19): 4577

Castro, M L, J P Ferreira, M Pintado, Ó L. Ramos, S Borges, and S Baptista-Silva. 2023. Grape by-products in sustainable cosmetics: nanoencapsulation and market trends. *Applied Sciences* **13** (16): 9168

Oboturova, N, S N Povetkin, N Nikulnikova, N Lazareva, N Klopova, A Lyubchanskiy, N Лебедева, Н М, *et al.* 2024. Upcycling agricultural byproducts into eco-friendly food packaging. *Potravinarstvo Slovak Journal of Food Sciences* **18**: 185–206

Dong, H, X Yang, Q Zhang, H Li, and L Chen. 2024. Activity and safety evaluation of natural preservatives. *Food Research International* **190**: 114548

Blog

The First

Anupam Buttan, Senior Manager, GRIHA Council

In a life one experiences a lot of firsts, some to cherish for all your life and a few you wish would have never happened.

I recently got an opportunity to moderate a panel discussion for the very first time in my life and would like to share my experience about the same.

GRIHA Council was about to host its seventh Regional Conclave in Bengaluru, and it was only a couple of weeks before the event, that I came to know that I will be the moderator for a panel discussion which was about solid waste management.

Being a moderator means that you are responsible for the whole session. It is the moderator who ensures that the discussions revolve around the main topic and do not deviate.

Before the Event

Prepare

It is of utmost importance that the moderator researches about the topic and panellists. I also drafted a few questions for each speaker to ensure focussed and engaging discussion.

When in doubt, seek advise

One should never shy away from seeking advice, especially when the help is available right at one corner of your office. So, for first couple of days while I was preparing myself for moderating the session, I was confused and clueless about how to conduct this session and that is when I got the best advice from my manager Mrs Shabnam Bassi, Deputy CEO, GRIHA Council. Amongst other things she said, "make sure to prepare an opening pitch for about 5–10 minutes."

Opening pitch

An opening pitch is by far the most important thing that a moderator should prepare. The first five minutes of this opening pitch helps you set base of the discussion that will be carried out for the next 60–90 minutes. It helps you connect with the audience and capture their attention, thus laying foundation for a successful interaction

During the Event

Being nervous

Sometimes being nervous does better to you than being overconfident. A little nervousness will help keep you calm and ensure you concentrate on job at hands.

Meet and greet

Make sure that you reach the venue well on time and meet with all the panellists in the session. Inform them about what you want to achieve from the discussion and how you plan to conduct the session.

Improvise

One should always be prepared for surprises; there is high probability that things won't pan out the way you have planned them to be. In my case it was last-minute addition of new member in the panel. Preparations and research before the event helped me dealing with this last-minute surprise and I was able to make last-minute amends in the discussion to accommodate the new guest.

Connect with the audience

It is very important that these discussions are planned in such a manner that we engage the audience as well. This makes the event more impactful.

Summarize the discussion

When its time to wrap-up the discussion, the moderator should try to summarize the important points that were discussed during the session.

Post Event

Take feedback

Feedback is very important as it provides insights about your performance and helps in identifying areas of improvement. This is crucial for personal and professional development.

4th GRIHA Regional Conclave

Chandigarh | 17 February 2025

Inaugural Address by Shri TC Nautiyal, IFS, Secretary (Science and Technology), Chandigarh Administration

Keynote Address by Shri S Narayanan, IFS, Director General, Department of New and Renewable Energy / HAREDA, Government of Haryana

GRIHA updates and Vote of Thanks by Smt. Shabnam Bassi, Deputy CEO and Secretary, GRIHA Council and Director, Sustainable Buildings Division, The Energy and Resources Institute (TERI)

Ar. Ashok B Lall, Founder and Principal Architect, Ashok B Lall Architects; Shri Lalit Bhardwaj, Vice President- Design (MEP) DLF Limited; Shri Parampal Singh, Senior Town Planner, Municipal Corporation, Amritsar; Shri Sanjay Seth, Vice President and CEO, GRIHA Council and Senior Director, Sustainable Infrastructure Programme, TERI, Shri Mohit Bansal, Founder, GMI Infra; Shri Surinder Bahga, Principal Architect, Saakaar Foundation, Chandigarh and Dr Mutthulingam Subramaniyan, Associate Dean -Infrastructure, IIT Ropar (from L to R) during the session 'Integrating Climate Resilience into Smart City Planning'.

Smt. Shabnam Bassi, Deputy CEO and Secretary, GRIHA Council and Director, Sustainable Buildings Division, TERI; Shri Sanjay Seth, Vice President and CEO, GRIHA Council and Senior Director, Sustainable Infrastructure Programme, TERI; Shri Amit K. Dass, Founder and CEO, Greenfinch Real Estate Engineers and Consultants Private Limited; Shri S. Narayanan, IFS, Director General, Department of New and Renewable Energy / HAREDA, Government of Haryana; Smt. Anita Kumari, Assistant Commissioner (Estt-I), Navodaya Vidyalaya Samiti, Regional Office, Chandigarh, Ministry of Education, Government of India and Shri T C Nautiyal, IFS, Secretary (Science and Technology), Chandigarh Administration (from L to R) during the lighting lamp ceremony

Shoba Rudra
Founder of RARE India

In this conversation with the GRIHA Council, Shoba Rudra, shares her insights on how hospitality industry can responsibly contribute towards realization of sustainable development. As Founder of RARE India, she explains how sustainability and community-inclusive tourism is a value addition rather than a source of making monetary gains. The interaction also makes us aware how RARE India has been an active participant to the common good with sustainability being the binding vine of the conscious luxury it offers.

RARE India has always championed responsible travel and conscious luxury. What inspired you to build a platform that integrates sustainability with heritage tourism?

RARE began when I envisaged a gap in the hospitality industry in 2023, though it was not named RARE at that point. This name was given in our first rebranding in 2009. It was later in 2012 that the conversation around responsible tourism and community inclusion gained momentum, and I recognized that for the hotels we had on board, community and conservation were a part of their vision from the time they began. Conservation of not only wildlife and environment, conservation of built heritage and also intangible heritage as craft and performing arts were a part of their destination narrative.

Every entrepreneurial journey comes with its own set of challenges. What were some of the most significant hurdles you faced in the early days of building RARE India, and how did you navigate through them?

When I began, the business was very small and I could literally do everything myself. The problem was when we grew to find and train talent and keep them. For almost 10 years, we were literally the only company that did what we did. To build a team I tried to look for people from other industries with varied skill sets, not necessarily tourism. That allowed me to train them in tourism and learn things like sales, PR, and technology from them.

"Building a business with a basic ethos will leave a positive impact on the planet, and personally leave a legacy for others to follow."

India is home to a vast number of artisans, craftspeople, and small hospitality ventures. What steps do RARE India takes to empower these communities while also ensuring environmental stewardship?

To be honest we only choose the right hotel partners who are working in remote areas, designing hotels that celebrate the destination, building narratives around its natural heritage, crafts or textiles and other conservation and development activities. Communities are encouraged to become part of the hotels through training or bringing in some of their skills that lends character to the hotel.

How do you educate or engage travellers in making sustainable choices while experiencing India's diverse cultural and natural heritage through RARE India?

We constantly point to sustainability and community-inclusive tourism as a value addition rather than giving them monetary discounts. These are seen in the narrative we use for promotions, the way we describe a hotel's USPs instead of saying it is close to a park gate we strive how it is far away from the madding crown or closer to a not so well-known cultural centre. The idea is to designate tourism so that no one place gets inundated by overtourism. We are constantly showing them new places, lesser explored states, through their tribal crafts, textiles and performing arts.

In your opinion, how can brands like RARE India contribute to global conversations on sustainability such as Sustainable Development Goals (SDGs) while ensuring that India's unique cultural narratives are authentically represented?

Our biggest work has been to build widespread awareness for responsible tourism through authentic and living examples around cultural, art, craft, and heritage experiences. The cue is in collaborations and constantly looking for authentic experiences and build value for them through tourism.

What initiatives or policies do you believe are crucial from the government or industry bodies to integrate sustainable practices in making a comprehensive and inclusive tourism sector?

Some amount of recognition and incentivizing will help hotels and travel companies to push for sustainable initiatives. Working examples of successful initiatives and pioneering models to be replicated in other landscapes can not only encourage innovation but help in spreading the advantage rather than reinventing the wheel. We must remember that we are at the beginning of the change towards a sustainable future in businesses, it may look as green washing, in efficiency, etc. but we are all at various levels of change. Soon some of the policies for carbon efficiency will become mandatory, it is inevitable to keep working in that direction.

Lastly, what advice would you give to young Indian entrepreneurs who want to build impact-driven, sustainable businesses rooted in culture and community?

Any business they want to get into globally, there is no escaping the fact that innovation towards sustainability and low impact is not just a business ideal but inevitable. The important thing is to build a business with a basic ethos that will leave a positive impact on the planet, and personally leave a legacy for others to follow.

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Creativity for Thea Creation!

Snigdha Majumder
Project Associate, Sustainable Agriculture Section, TERI Gram

Creativity for the creation is in demand,
Climate-resilient planet– is the errand.
Come up with solutions, innovative!
To save generations from plunging into grief.
Basic amenities are costing wildlife,
Will natural resources be enough to thrive?
Crops are dying, the soil's drying,
Cyclones, earthquakes are too often coming!
Nano-fertilizers, biostimulants, genetic engineering,
Any other technology (emerging)?
For a future full of hope,
With climatic turbulence to cope.
Your ideas play pivotal role,
Sustainable world–TERI's goal!

13 OCTOBER 2025

Think
TARANG
Aspire
Reimagine
Act for a
New
Greenworld

Paryavaran Rakshak Programme 4.0

A Prelude to the 17th GRIHA Summit

As a prelude to the 17th GRIHA Summit, GRIHA Council organized an engaging youth event on 13 October 2025, at the India Habitat Centre, New Delhi. The programme celebrated creativity and climate consciousness through vibrant student performances, competitions, and exhibits encouraging young minds to think innovatively and act responsibly towards a sustainable future.


TARANG


TARANG
FUTURE


TARANG


TARANG


THE GODMAN COLLECTION
WASTE to WEALTH

Environmental Police

A need for India's urban ecosystem

This article, authored by **Anmol Chitransh**, is a step further towards stringent implementation of rules and regulation pertaining to the environmental amelioration. The article qualifies to be an interesting read, attributed to the idea it carries, the environmental police. This concept is crucial for India's sustainable growth, especially as urban pollution levels reach alarming heights. The author says with emphasis by addressing both enforcement and awareness gaps, such a force could lead to cleaner cities, healthier citizens, and a greener future.

Anmol Chitransh

works in the capacity of Project Officer with GRIHA Council. His areas of interest include environmental regulations, compliance mechanisms, and exploring innovative governance models like environmental police for sustainable cities. He strives to bridge policy with practical action for a more sustainable future.

Concept of Environmental Police

The idea of an 'environmental police' is simple yet powerful: a dedicated force that enforces environmental rules, prevents pollution, and protects natural resources. Such a unit could deal with issues like illegal waste dumping, toxic emissions, deforestation, or even building code violations that harm the environment. In today's fast-growing Indian cities, where urban expansion often outpaces regulation, this kind of force could play a crucial role in ensuring accountability.

Other countries have already tried similar approaches. China, for instance, set up an Environmental Police in Beijing in 2017 to crack down on smog-causing activities like waste burning and construction dust. Brazil has a battalion that patrols the Amazon against illegal logging and mining. In the United States, several states have officers who investigate pollution cases. Even in India, the Wildlife Crime Control Bureau (WCCB) has shown how a specialized agency can work its operations against poaching and wildlife trade stand as proof of the concept. Together, these examples suggest that India could benefit from a dedicated environmental police to tackle its pressing urban challenges.

Indian Context and Urgency

Despite various regulations that have been passed to curb the emission and discharge of pollutants into the environment, we have lagged behind in their strict enforcement. The following

news excerpts highlight the ongoing challenges:

- Air pollution: The apex court said everyone was 'smart enough' to understand during certain times data was collected and they did not burn stubble at that time (Hindustan Times 2024a).
- Water pollution: The National Green Tribunal (NGT) on Thursday imposed environmental compensation of ₹25.22 crore on each of the Municipal Corporation of Delhi (MCD) and Delhi Jal Board (DJB) for failing to check pollution of stormwater drains and subsequently, the Yamuna (Times of India 2024b).

Examples of Countries with Environment Police

India already has a force focused on safeguarding wildlife: the WCCB that specialized in addressing wildlife-related crimes, including poaching, illegal wildlife trade, and habitat destruction. The success of the WCCB (for example, Operation Thunder in 2020) demonstrates India's potential to implement a broader environmental police force to tackle diverse ecological issues.

1. **China**

- China established its first Environmental Police Force in 2017 in Beijing. This unit focuses on curbing air pollution caused by industrial emissions, construction dust, and biomass burning.
- Results: A PNAS study analysing China's environmental inspection campaigns found that SO_2 levels in inspected cities dropped by 25–52% during inspection periods compared to control cities. The findings underscore how sustained enforcement like an environmental police can drive real air quality improvements (Karplus and Wu 2023).

2. **Brazil**

- Brazil's Environmental Police Battalion addresses deforestation, wildlife trafficking, and illegal mining in the Amazon.
- Results: Successful operations significantly reduced illegal logging activities (WWF 2021).

3. **United States**

- Various states in the U.S., like New York, have Environmental Conservation Officers who enforce environmental laws and investigate pollution complaints.
- Results: Several high-profile pollution cases have led to stricter regulations and improved compliance (DEC 2025).

The Problems Faced in India

India faces severe environmental challenges:

- Air pollution: According to the World Air Quality Report 2024 by IQAir, India ranks fifth-most polluted country in the world (Mohan 2025). The problem of air pollution has escalated into a public health emergency, especially in major urban centres like Delhi, Mumbai, and Kolkata. Each winter, Delhi's air quality index (AQI) frequently enters hazardous territory, with $PM_{2.5}$ and PM_{10} concentrations far exceeding safe limits. Contributing factors include stubble burning in nearby states, unchecked vehicular and industrial emissions, and weak enforcement of environmental regulations.

- Water pollution: An estimated 70% of India's surface water is contaminated, posing serious public health and environmental risks across the country (Hirani 2019). According to a Reuters report in March 2024, Bengaluru's main reservoir dropped to just 16% capacity, and over 6,900 borewells had dried up, resulting in water supply shortages. A similar crisis played out in Chennai, where declining rainfall, overdependence on groundwater, and poor infrastructure planning led to widespread water rationing. These repeated crises underline the consequences of unsustainable water management and the gaps in urban environmental governance.
- Waste management: India generates roughly 62 million tonnes of municipal solid waste annually, but only about 70% is formally collected, and just ~20% is processed or recycled; the rest ends up in open dumps or unmanaged landfills (Ravish 2025). In Mumbai, the situation is particularly alarming: the city produces around 6,300–7,000 tonnes per day (Gokarn 2024), yet nearly 50% of this waste isn't processed properly, instead being dumped illegally or overfilled in landfills. Consequently, local water bodies suffer contamination from leachate, and air quality declines due to decomposing waste and landfill fires.

These persistent environmental governance failures whether in air quality, water management, or solid waste handling underscore the urgent need for a dedicated environmental police force empowered to enforce laws, monitor violations, and ensure accountability across India's urban ecosystems.

Efforts Required for Creating an Environmental Police Force in India

Establishing an environmental police force in India would require significant efforts and adaptation of strategies that have proven successful in other countries:

1. **Policy and legislative framework**

India could create a robust legal framework that defines the roles and responsibilities of the environmental police. This could include stringent penalties for polluters and mandatory compliance checks for industries and construction sites.

2. **Capacity building and training**

India would need to provide specialized training to its officers to handle complex challenges on environmental laws, pollution monitoring, and disaster response.

3. **Technology integration**

Leveraging technology, such as drones and satellite imagery, can help monitor large areas, detect violations, and gather evidence efficiently. Real-time air and water quality monitoring systems should also be deployed.

4. **Public participation and awareness**

Public-awareness campaigns can educate citizens about the importance of reporting environmental crimes. Encouraging community involvement will foster a sense of shared responsibility.

5. **Inter-agency collaboration**

To address coordination challenges, the environmental police would need to work closely with municipal bodies, pollution control boards, and non-governmental organizations (NGOs).

6. Funding and resources

Sufficient funding is essential to ensure the environmental police are properly equipped and operate effectively. Therefore, financial allocations should prioritize measures targeting air and water pollution control.

7. Vigilance

To ensure accountability and prevent misuse of power, a vigilance body should oversee the environmental police through independent audits, grievance redressal, and performance reviews, with active involvement from the competent bodies.

Conclusion

The concept of an environmental police is crucial for India's sustainable growth, especially as urban pollution levels reach alarming heights. By addressing both enforcement and awareness gaps, such a force could lead to cleaner cities, healthier citizens, and a greener future. Collaboration with organizations like GRIHA can amplify its impact, ensuring that India meets its environmental and sustainable development goals.

References

Department of Environment Conservation (DEC). 2025. Press release by Environment Conservation Police on Patrol. New York. Details available at <https://dec.ny.gov/news/press-releases/2025/3/environmental-conservation-police-on-patrol-0>

Gokarn, S. 2024 (July). Citizen matters: Mumbai, here is what happens to the garbage you throw out. Details available at <https://citizenmatters.in/mumbai-garbage-disposal-journey-of-waste/>

Hindustan Times. 2024a (November). Punjab Haryana Government slow in acting against farmers burning stubble. New Delhi. Details available at <https://www.hindustantimes.com/cities/chandigarh-news/punjab-haryana-govts-slow-in-acting-against-farmers-burning-stubble-sc-101732814479120.html>

Hirani, P. 2019 (October). 2019. WeForum. Water pollution is killing millions of Indians. Details available at <https://www.weforum.org/stories/2019/10/water-pollution-in-india-data-tech-solution/>

Karplus, V J and M Wu. 2023 (February). William Clark (ed.). PNAS – Dynamic responses of SO_2 pollution to China's environmental inspections. Details available at <https://www.pnas.org/doi/full/10.1073/pnas.2214262120?>

Mohan, V. 2025 (March). With 13 out of 20 most polluted cities, India ranks 5th globally. Time of India. Details available at <https://timesofindia.indiatimes.com/india/with-13-of-20-most-polluted-cities-india-ranks-5th-globally/articleshow/118909491.cms>

Ravish, P. 2025 (April). Current World Environment. Sustainable management of landfill sites in India: addressing environmental, health, and socioeconomic challenges. Details available at <https://cwejournal.org/vol1no1/psustainable-management-of-landfill-sites-in-india-addressing-environmental-health-and-socioeconomic-challengesp?utm_source=chatgpt.com>

Times of India. 2024b (November). NGT slaps damages of 25 crore each on Delhi Jal Board and Municipal Corporation of Delhi for polluting Yamuna river. New Delhi. Details available at <https://timesofindia.indiatimes.com/city/delhi/ngt-imposes-25-crore-penalty-on-djb-and-mcd-for-polluting-yamuna-river/articleshow/115575923.cms>

World Wide Fund for Nature (WWF). 2021. Technology boosts the fight against environmental crimes in Acre State. Details available at <https://www.wwf.org.br/?79209/Technology-boosts-the-fight-against-environmental-crimes-in-Acre-State>

5th GRIHA Regional Conclave

Guwahati | 10 March 2025

Valedictory Address

by Shri Keshab Mahanta, Hon'ble Minister, Departments of Health and Family Welfare and Science and Technology, Information and Technology, Government of Assam

Special Address

by Dr Jaideep Baruah, Director, Assam Science Technology and Environment Council (ASTEC), Department of Science, Technology and Climate Change, Government of Assam

Welcome Address

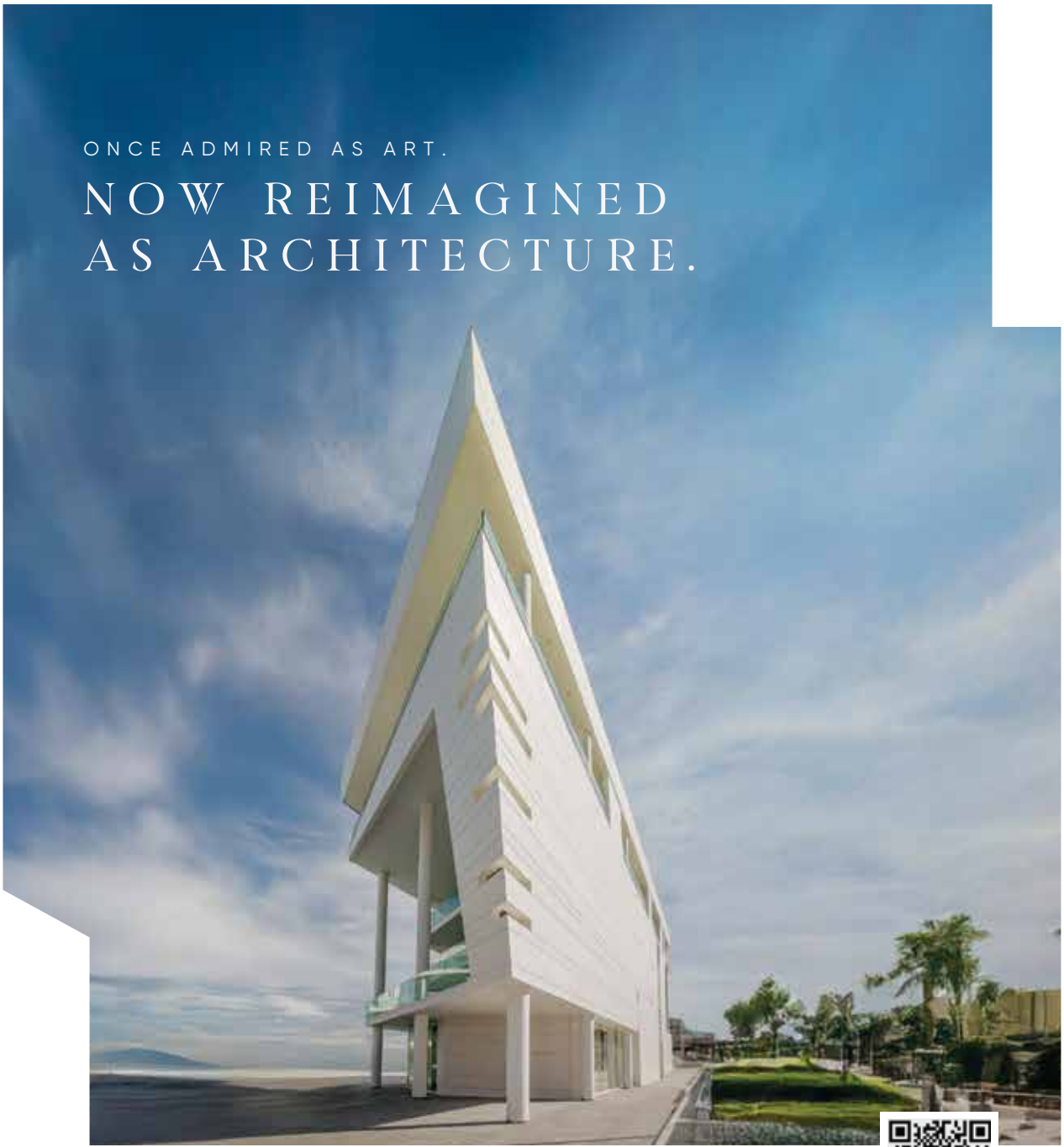
by Shri Sanjay Seth, Vice President and Chief Executive Officer, GRIHA Council and Senior Director, The Energy and Resources Institute (TERI)

Plenary Session

Ms Shabnam Bassi, Deputy CEO and Secretary, GRIHA Council and Director, Sustainable Buildings Division, TERI; Mr Manish Chauhan, Cluster Project Manager, Northeast sector, Larsen & Toubro (L&T); Prof. (Dr) Hari Prasad Agarwal, Dean, Royal School of Architecture (RSA), Royal School of Design (RSD), Royal School of Fashion Design & Technology (RSFT) and Royal School of Fine Arts (RSFA); Mr Soumya Das Gupta, Executive Engineer, PWRD, Brahmaputra Bridge Construction Division-II; Ar. Rittick Hazarika, Principal Architect, Rittick Hazarika Design Associates (RHDA) (from L to R), during the session 'Building Smart, Green Cities – Infrastructure for Tomorrow'

Release of GRIHA Publication

A GRIHA Council Publication — Set of Manuals on Sustainable Guidelines for Design Implementation, Construction Management and Operation & Maintenance was released during the valedictory session of GRIHA Regional Conclave, Guwahati



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EcoKaari

Humanizing fashion through waste plastic handloom weaving

EcoKaari, where 'Eco' stands for eco-friendly and 'Kaari' comes from *Kaarigar* (artisan), represents the deep connection between artisans and the environment. Both are interconnected and interdependent, and EcoKaari was founded to nurture this relationship while addressing one of the most pressing challenges of our times, plastic waste. Established in Pune, EcoKaari is a social enterprise with a clear and powerful vision: to reduce plastic waste, create dignified livelihoods, and revive the rich Indian tradition of handloom weaving.

EcoKaari upcycles used plastic waste such as carry bags, food wrappers, glittery gift wrappers, old cassette tapes, and e-commerce packaging items usually considered

Nandan Bhat,
Founder and CEO

non-recyclable. Instead of letting them end up in landfills or polluting rivers and oceans, we transform them into handcrafted, sustainable lifestyle products.

The inspiration came from observing the devastating impact of single-use plastics, which are clogging ecosystems at an alarming rate. Conventional recycling largely ignores multilayered and low-value plastics, often treating them as useless. At EcoKaari, we saw potential in this waste. With the right process and creativity, what the world discarded could be given a meaningful second life. This belief became our foundation.

What sets EcoKaari apart is the fusion of tradition and innovation. Our process avoids electricity-driven machinery and instead employs charkhas (spindles) and handlooms to weave fabric from plastic waste. This method not only reduces our carbon footprint but also preserves the cultural heritage of handloom weaving, a craft that is slowly fading in modern India. The process is entirely manual: plastic waste is collected, cleaned, sanitized, segregated by colour, and cut before being woven into fabric. From this fabric, artisans craft durable and fashionable products such as handbags, wallets, home décor, stationery, and gifting items.

At the heart of EcoKaari are the artisans and women from marginalized communities. Many come from vulnerable or semi-literate backgrounds, and through our training programmes, they acquire skills that enable them to become financially independent. For them, EcoKaari is more than a job; it is dignity, empowerment, and hope. By combining environmental sustainability with social inclusion, we aim to create change that is holistic and lasting.

Since its inception, EcoKaari has upcycled over 40 lakh plastic waste bags and touched the lives of more than 100 artisans and women beneficiaries in Pune, Bellary, and Kolkata. Our products have reached conscious consumers across India and beyond, resonating with those who value ethical, handmade, and sustainable choices.

Our contribution to sustainable change is threefold:

- Environmental impact: Diverting plastic waste away from landfills and oceans by upcycling it into functional products.
- Social impact: Generating employment and financial independence for marginalized women and artisans.
- Cultural impact: Preserving the traditional art of handloom weaving while adapting it to modern sustainability challenges.

Recognition of our work has been humbling. We were honoured when Hon'ble Prime Minister Shri Narendra Modi mentioned EcoKaari in his 'Mann Ki Baat' address, appreciating our efforts in upcycling plastic waste into valuable products. Additionally, EcoKaari has been awarded the Upcycling Certificate by the Ministry of Textiles, Government of India, validating our innovative approach of blending heritage crafts with sustainability. These recognitions have strengthened our resolve to continue and expand our mission.

Our journey has not been without hurdles. Convincing people that waste plastic can be turned into beautiful, functional products was not easy, and competing in a market dominated by fast fashion remains a challenge. Yet, every handwoven product we create stands as proof that sustainable fashion is both possible and essential for our collective future.

EcoKaari is not just a start-up; it is a movement to humanize fashion, where every product carries a story of waste transformed, livelihoods created, and traditions revived. By rooting innovation in tradition, we hope to inspire individuals, communities, and organizations to rethink waste and embrace sustainability in their everyday lives.

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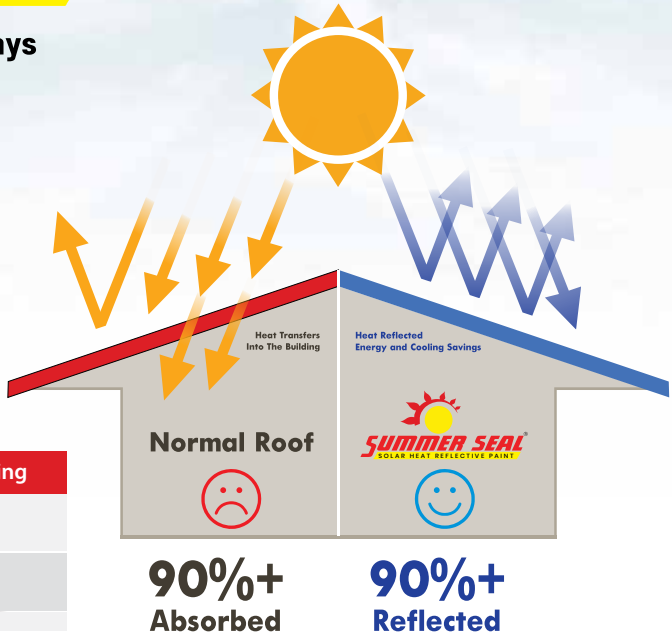
Temperature Resistance,°C	18.5,°C	10,°C



Our Awards & Certificates

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My Association with the GRIHA Council has been, since 2012, an immensely enriching experience. From the outset, Team GRIHA demonstrated a strong commitment to sustainability, technical excellence, and a collaborative approach that greatly enhanced the overall trajectory of our present and ongoing Green Building Projects.

The GRIHA rating for the Existing Building framework provided a comprehensive and structured methodology for assessing environmental performance, making it easier for our project team to align with best practices in sustainable design and construction.

What truly stood out was the support we received throughout the certification process. The Council's technical experts were approachable and proactive in resolving queries, offering constructive feedback at every stage, and finally conducted a Project Audit in person. This site visit was extremely fruitful for drawing attention towards the missing criteria to be achieved to achieve the GRIHA Three Star Rating. Necessary guidance was given by the Team GRIHA, who minutely inspected and observed each aspect of the project. This not only ensured that our building adhered to the highest environmental standards but also helped us improve our internal practices and awareness about sustainable resource use.

GEO Designs, Vadodara, currently has more than 75 GRIHA projects on hand. The training sessions and capacity-building workshops offered by GRIHA under Orientation Workshops are particularly valuable. They are beyond compliance and encourage the project team to think critically about the long-term environmental and social impacts of the Green Building Project works on hand. The knowledge the Project Team gained from these engagements continues to influence how projects are to be approached, both technically and ethically.

Collaborating with GRIHA is more than just meeting certification criteria, it is a learning journey that reshaped our sustainability mindset. I would highly recommend their framework and guidance to anyone seeking to make a meaningful difference through green building.

Testimonial

Bridging ESG and Green Ratings for Climate-resilient Infrastructure

Achieving climate resilience is no longer just about installing energy-efficient systems or meeting certification checklists. It requires a systemic shift where environmental performance, social responsibility, and ethical governance are integrated seamlessly. This article, authored by **Kanishka G,** establishes GRIHA and ESG are not competing frameworks, but complementary ones. When they are brought together, the result is an infrastructure that not only meets present needs but safeguards future generations.

Kanishka G

is ESG Analyst at Jwala Risk Consulting, with interests in climate resilience, SDG integration, and sustainable infrastructure planning

In the face of intensifying climate change, India's built environment finds itself at a critical juncture. Building homes, markets, offices, and institutions consume vast amounts of energy and water, generate waste, and contribute significantly to greenhouse gas (GHG) emissions. Over the past two decades, green building rating systems like Green Rating for Integrated Habitat Assessment (GRIHA) have promoted energy-efficient and environmentally responsible infrastructure. At the same time, the rapid emergence of environmental, social, and governance (ESG) frameworks is reshaping how organizations think about long-term sustainability.

Although both GRIHA and ESG aim to reduce environmental harm and promote sustainable practices, they are often treated as distinct, non-overlapping systems. However, when used together, they have the potential to unlock a more holistic and resilient pathway, one that combines technical performance with ethical and inclusive governance.

Environmental, Social, and Governance and Green Ratings: two halves of a whole

GRIHA is structured to measure the environmental performance of a building, focusing on parameters such as energy use, water conservation, sustainable material selection, and waste management. These are practical and design-based metrics that support developers, architects, and engineers in achieving eco-efficiency.

On the other hand, ESG frameworks assess an

organization's broader impact through a set of non-financial indicators. These include climate risk disclosures, workforce diversity, anti-corruption practices, and stakeholder engagement. ESG, in many ways, addresses how sustainability is governed, reported, and embedded into the organizational culture.

When these two approaches are kept separate, we risk creating efficient buildings without ethical accountability or progressive organizations that fail to align their operations with environmentally sound design. Bridging the gap between ESG and green ratings can help move the needle from short-term certification towards long-term resilience.

Real-world Application: from design to impact

Drawing from my experience contributing to the Carbon Neutral Koyambedu Market Detailed Project Report (DPR) developed in collaboration with Indian Institute IIT Madras, the project presents a compelling example of how ESG frameworks and green building principles can converge to support large-scale urban sustainability. The initiative focused on transforming Koyambedu Market, one of South India's largest wholesale hubs into a carbon-neutral zone through integrated clean energy systems, circular economy practices, and climate-adaptive infrastructure. The Detailed Project Report (DPR), developed with input from academic institutions, environmental bodies, and technical consultants, laid out several high-impact recommendations:

- Installing a 10.418 MW rooftop solar PV system to reduce dependency on fossil-fuel-based grid power
- Implementing a 27.638 MWh lithium–iron phosphate battery energy storage system (BESS) to ensure energy reliability and decarbonization
- Establishing cold storage powered by biomass derived from banana waste, aimed at minimizing food spoilage and reducing emissions

The project aligned strongly with GRIHA's technical benchmarks for energy and waste management, while also demonstrating how structured ESG thinking, especially around climate impact (E), community benefit (S), and project governance (G) can elevate the scope and credibility of sustainable infrastructure planning.

Water and Waste: connecting the dots

Resource audits play a vital role in both ESG and green rating contexts. For instance, water audits when done thoroughly can uncover usage inefficiencies, leakage losses, and operational shortfalls in treatment systems. GRIHA rewards such efforts under its water efficiency category, while ESG frameworks recognize water stewardship as a key environmental metric aligned with SDG 6 (Clean Water and Sanitation).

Similarly, waste audits that map material flows, segregation systems, and end-of-life management not only support GRIHA's Zero Waste Certification, but also contribute to ESG disclosure metrics. For example, tracking hazardous waste treatment, circular reuse opportunities, or vendor accountability improves transparency, benefitting both certifications and stakeholder engagement.

The Governance Advantage

One area where ESG clearly adds value to green ratings is in governance. While GRIHA emphasizes site-level sustainability, ESG brings attention to how sustainability is managed, reported, and ethically executed.

Key governance elements such as:

- Anti-corruption measures
- Workplace equity and diversity
- Prevention of sexual harassment (POSH) compliance
- Data privacy and cybersecurity policies

are often outside the scope of traditional building certifications

but are essential to making any workplace or facility truly sustainable. By incorporating these governance measures into the operations of a green building, be it a school, office, or public space developers and organizations can ensure that their projects are not only environmentally sound, but also socially responsible and ethically governed.

A Synergistic Model: ESG supporting GRIHA

Here's how ESG can strengthen green building efforts:

- Environmental (E): ESG reports often include metrics such as carbon footprint, energy use, and water management, which correlate directly with GRIHA categories on resource efficiency (BEE 2019).
- Social (S): ESG's focus on worker health, community impact, and diversity supports GRIHA's emerging focus on occupant well-being and innovation.
- Governance (G): Transparent procurement, legal compliance, and third-party validation add credibility to green ratings and encourage higher standards of implementation.

Recommendations for Integration

To foster stronger collaboration between ESG and green ratings like GRIHA, the following steps are recommended:

- Develop crosswalk templates: Create standardized tools that map GRIHA metrics to ESG disclosure areas.
- Encourage dual reporting: Promote voluntary ESG reporting for green-certified projects to attract responsible investors and public confidence.
- Capacity building: Organize joint training for ESG professionals and green building consultants to encourage interdisciplinary dialogue.
- Centralized platforms: Design digital platforms that combine ESG and green building documentation to support monitoring and evaluation.

Achieving climate resilience is no longer just about installing energy-efficient systems or meeting certification checklists. It requires a systemic shift where environmental performance, social responsibility, and ethical governance are integrated seamlessly. GRIHA and ESG are not competing frameworks, but complementary ones. When they are brought together, the result is infrastructure that not only meets present needs but safeguards future generations.

Bibliography

Bureau of Energy Efficiency (BEE). 2023. National Energy Efficiency Dashboard: buildings sector. New Delhi: Ministry of Power, Government of India. Details available at <https://beeindia.gov.in>

Global Reporting Initiative (GRI). 2021. GRI Standards 2021: universal standards. Amsterdam: GRI. Details available at <https://www.globalreporting.org/standards>

International Renewable Energy Agency (IRENA). 2022. Renewable Energy and Battery Storage: innovation outlook. Abu Dhabi: IRENA. Details available at <https://www.irena.org>

Ministry of Environment, Forest and Climate Change (MoEFCC). 2021. *India: Third Biennial Update Report to the UNFCCC*. New Delhi: Government of India

NITI Aayog. 2020. SDG India Index and Dashboard 2019-20. New Delhi: NITI Aayog. Details available at <https://sdgindiaindex.niti.gov.in>

Sullivan, R and A Gouldson. 2021. Integrating ESG into Infrastructure Investment. *Journal of Sustainable Finance & Investment* **11** (2): 101–115. Details available at <https://doi.org/10.1080/20430795.2020.1804777>

The Energy and Resources Institute (TERI). 2019. *Green Ratings for Integrated Habitat Assessment (GRIHA) Manual* Volume 1–4. New Delhi: GRIHA Council. Details available at <https://www.grihaindia.org>

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Shree E Micro Concrete+

Applications: For Repairing, Restrengthning, Restoration work of Damage surfaces of Concretes of structurers and Structructural members.

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Shree E Plast+ (M30+)

Applications: For Plastering, Levelling, Finishing Internal, External surfaces of walls, R.C.C Shear walls, Repairing of Precast R.C.C Members, Structures, Surfaces without hacking & without use of bonding agent.

Shree E Tile Bond++ (Premium Type II)

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Unique Product

Shree E MagratifixT3+

Applications : Polymer modified Adhesive for fixing tiles, stone tiles on exterior wall substrate like plaster or concrete, Ceramic tiles, Clay tiles, vitrified, Glass mosaic tiles and Porcelain tiles and all natural stone tiles

Shree E Bond++ (Premium 30)

Applications: High Strength, Non Shrink & Hydrophobic Property, Self Curing , Thick Bed Ready Mix for jointing A.A.C Masonary & self supporting walls. (For Thickness 5 to 10 MM)

Shree E LB Adhesive+++ (Liquid + Powder)

Applications: For fixing Heavy stones, Marbles, Granites, Italian Marble, Heavy Tiles on floors / walls & for cladding purpose in all types of projects.

Shree E Tile Bond+ (Standard Type I)

Applications: For fixing Ceramic tiles on walls / floors, porous stone, tiles in Interior & Exterior Areas in all types of projects.

Shree E Cosmetic Repair Coat+

Applications : Polymer modified single component for thin layer repairing / refinishing material for Pin holes / Patches, Superficial Cracks found in Mivan surface concrete / other substrates.

Unique Product

Shree E Plast+ (FC) (EF)

Applications: For Leveling, finishing internal / External wall surfaces / honey combing surfaces of Mivan / RCC / Structural-

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Applications: For repairing, levelling, Finishing, internal & external surfaces of all type of R.C.C members, Lift shaft walls,

Shree E Crack Filler+

Applications: For filliing cracks between A A C block & R.C.C in the brick /AAC /Block wall, Plaster, Gypsum, floor, Roof.

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Shree E NSG 60+

Applications: For Filling & Finishing Tie Rod holes/Slots in R.C.C, -

Shree E Putty+

Applications: For providing water resistance, smooth & finished level surface to all types of R.C.C., Masonry, Plaster, Boards & Walls.

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Applications: For levelling the floor surface before fixing tiles / Marbles/ Granites for floor with Tile adhesive.

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GRIHA PROJECTS' FOOTPR

Upto **15%** FAR benefits for GRIHA certified projects

Exemption from environmental clearance for GRIHA projects

An incentive of additional FAR will be provided at no cost, with **5%** for 3-star, **7.5%** for 4-star, and **10%** for 5-star rated buildings, along with a **100%** exemption from the building scrutiny fee.

MoHUA gives **1%** to **5%** extra ground coverage and FAR for projects of more than 3,000 m^2 plot size on the basis of GRIHA evaluation

Buildings with GRIHA rating certificate will be eligible for availing additional **7.5%** to **15%** FAR free of charge

- Buildings with a GRIHA rating will be eligible for incentives, including a **5%** discount on the total payable amount for the chargeable FSI

- **PMC & PCMC**
  - Discount in premium charges (payable to Municipal Corporation, for both GRIHA and SVA GRIHA projects)
  - Up to **10%** discount could be availed on Property Tax for home owners for the GRIHA projects. For SVA GRIHA projects, up to **15%** discount on Property Tax for home owners
- PWD, GoM, mandates GRIHA rating for both new and existing government buildings
- **MAHARASHTRA:** Government of Maharashtra has made it mandatory to achieve a minimum of 3-star rating for construction projects under GRIHA for all buildings belonging to government, semi-government, local bodies and public sector undertakings for propagating sustainable habitat development in the state

Incentives on One-time Building Tax, Stamp Duty and Property Tax for green buildings

*The numbers indicated in the map represent registered projects for rating with the GRIHA Council.

RINT & LINKED INCENTIVES

GRIHA registered projects = 5100+
GRIHA footprint = 105 MSM (APP)

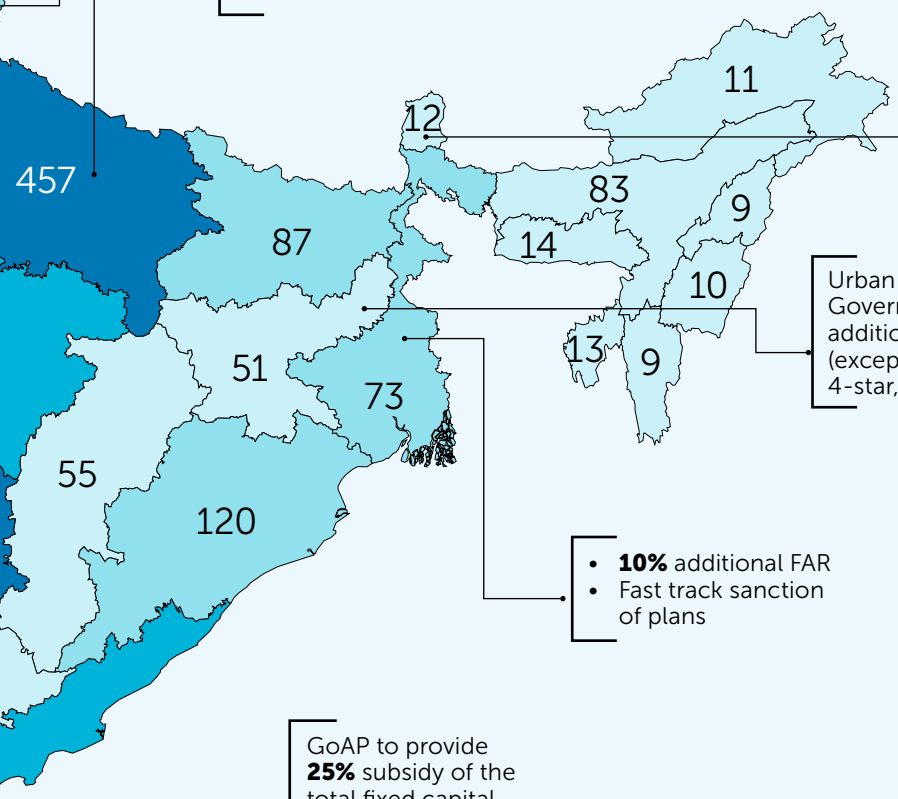
0 — 100+

10% additional FAR for GRIHA 4/5-rated projects

- Up to **15%** extra FAR for all building uses (except plotted residence) for all GRIHA variants
- All PSUs and government buildings to be constructed as per GRIHA norms

- All buildings will be granted additional FAR, with **3%** for 1-star, **6%** for 2-star, **9%** for 3-star, **12%** for 4-star, and **15%** for 5-star rated structures

Mandatory for all government and semi-government projects to go for a minimum 3-star GRIHA rating



Urban Development and Housing Department, Government of **JHARKHAND: 3%, 5%,** and **7%** additional FAR shall be awarded to all building uses (except plotted residential) for achieving a 3-star, 4-star, or 5-star GRIHA rating, respectively

- **10%** additional FAR
- Fast track sanction of plans

GoAP to provide **25%** subsidy of the total fixed capital investment of the project

25% subsidy for environmental protection infra for industrial projects

www.grihaindia.org/griha-incentive

OTHERS

1. Fast Track Environmental Clearance by the MoEFCC for GRIHA pre-certified projects
2. GRIHA and GRIHA AH certified (4 and 5 star projects) would be provided financial incentives under SUNREF India programme
3. MoUD has issued a notification for local authorities to incentivize and provide 1% to 5% extra ground coverage and FAR for projects of more than 3,000 m^2 plot size on the basis of GRIHA evaluation

Role of CSR in Climate Change

Assessment of public sector oil and gas companies in India

In this piece of writing, **Amitava Bhattacharyya,** talks about role of corporate social responsibility in addressing climate change, the defining crisis of our time and primarily driven by anthropogenic activities. The author defines and establishes how CSR spending more or less remains unanalysed. He asserts, there's a critical need to assess how these initiatives align with government schemes and influence socio-economic outcomes. He rightly outlines, CSR expenditure by the major oil companies is still incurred in health and education with almost negligible impact on environmental sustainability sector

Amitava Bhattacharyya

is a retired IAS. He served for Government of Gujarat in various capacities both in the field and in the Secretariat.
Presently, Amitava Bhattacharya is associated with a non-governmental organization on a voluntary basis and working in the area of anti-trafficking of women and children in India and other south-east Asian countries.
His areas of interest include climate change, corporate social responsibility issues, drinking water quality, sustainability issues and energy sector.

Corporate social responsibility (CSR) refers to businesses acting ethically and contributing to economic development while improving the lives of employees, their families, and communities (Fernando 2013). In the West, CSR historically emerged as philanthropy by leading industrialists like Henry Ford and Rockefeller and in India by the Tatas and Birlas.

The CSR in India was initially voluntary but became mandatory with the Companies Act, 2013. Section 135 mandates companies with ₹1000 crore turnover, ₹500 crore net worth, or ₹5crore profit to allocate 2% of average net profit (past 3 years) to CSR. Schedule VII lists eligible areas for funding (the Companies Act, 2013).

The oil and gas (O&G) sector is central to India's growth, powering key areas like industry, transport, and infrastructure. India's O&G sector includes major public entities like ONGC, IOCL, HPCL, and BPCL, along with private players like Reliance and CAIRN. CSR budgets across listed Indian companies rose from ₹26,579.78 Cr in FY 2022/23 to ₹29,986.92 crore in FY 2023/24. CSR projects surged from 17,096 (2017–18) to 51,966 (2023–24), indicating growing corporate social commitment.

Figure 1 *Industrial oil and gas infrastructure framed by green buffers, illustrating CSR-led environmental integration strategies adopted by public sector enterprises in India*

The highest Profit After Tax in FY 2023/24 was recorded by ONGC (₹40,305 crore), followed by IOCL (₹24,184 crore), Power Grid Corporation (₹17,074 crore), and NTPC (₹16,111 crore). All four are public sector units, with the top two from O&G. The impact of their CSR spending remains unanalysed. There's a critical need to assess how these initiatives align with government schemes and influence socio-economic outcomes. The evaluation of the pattern of CSR expenditure by the oil companies shows that the majority of the expenditure is still incurred in health and education with almost negligible impact on environmental sustainability sector.

In regard to greenhouse gas (GHG) emission and climate change, India is not a major contributor to global climate disasters, which are largely driven by the energy demands of the Global North. The US, as a key player, has withdrawn from several climate forums, leaving countries like India, leader of the Global South to take the lead in combating climate change.

India's GHG emissions rose over 76% between 2005 and 2017. Even with moderate GDP growth, fossil fuel demands in sectors like power, transport, and agriculture continue to rise. The planet is about to cross the tipping point of 1.5°C temperature rise, and vulnerable areas like deserts, coastal areas, and hilly regions must prepare for recurring climate calamities, annual or more frequent.

In respect of Indian Climatic Financial requirement, a financial exercise was done by private financial experts in the recent past, which indicated that by the year 2021, the country would need a gigantic amount of resources to have in place a credible adaptation as well as mitigation measures. The year 2021 is long past, but the requirements have multiplied since then. The three focus areas which have been indicated in some of the reports is regarding power generation, sustainable agriculture, food security and building resilient cities with all concomitant features such as clean drinking water, sanitation, health, robust disaster management infrastructure and ensuring equitable rights to food, shelter, health, education for all sections of people (Bhattacharyya 2023). The estimate, which is sometimes mentioned in some literature is about USD 900 million, up to the year 2030. This figure is neither feasible, nor expected to be available form UN Agencies and Global North, especially USA and EU. The country therefore should make efforts to look for resources

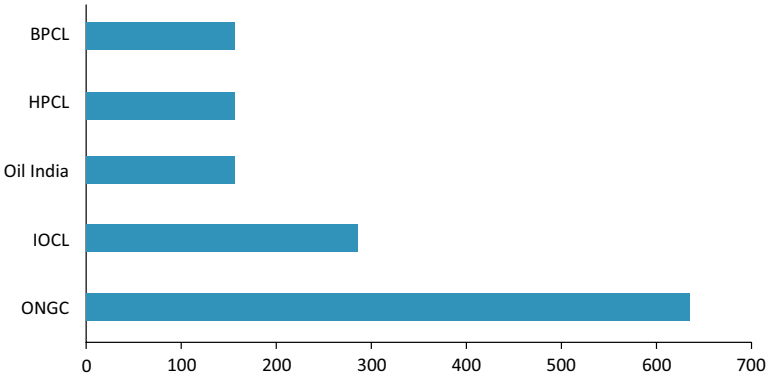


Figure 2 *CSR contributions of leading oil and gas companies in the public sector in the financial year 2023/24*

Source *Thacker and Bhattacharya (2025)*

Figure 3 *CSR investment growth supporting environmental sustainability*

from within the country by way of public funding and investment through private investors, both Indian and foreign, and judicious use of CSR funds.

The total CSR funds, which was ₹5582 crore during 2018–21, would have been about 10% of the country's total CSR expenditure for the same period. Judging by the most optimistic estimate, the CSR funding during this period would have been around ₹10,000 crore. Although it cannot be denied that this amount is too miniscule to be really of any major importance in tackling adaptation or mitigation measures on climate management, my view is that this involvement will bring out commitment of various stakeholders in this common cause. If this amount can be leveraged and people's participation in the management of this fund for climate change measures is ensured, there is no reason why India cannot lead the charge of Global South in making a big dent on the global fight against climate change, even when the Global North, the main culprits for perpetrating the still unfolding saga of climate disaster and calamities, is remaining tight-lipped and non-committal.

References

Bhattacharyya, A. Songwe V, E Soubeyran, and N Stern N (2023). *A Climate Finance Framework: decisive action to deliver on the Paris Agreement (Summary): second report of the Independent High-Level Expert Group on Climate Finance*. London: Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science

Child Rights Resource Centre. 2007. *Save the Children Sweden in Vietnam*. Details available at <https://resourcecentre.savethechildren.net/document/annual-report-2007-save-children-sweden-vietnam>

Fernando, WRPK 2013. Corporate Social Responsibility in Municipal Councils of Sri Lanka. *Kelaniya Journal of Human Resource Management* **8** (1): 21. DOI: https://doi.org/10.4038/kjhrm.v8i1.2.

Koolwal, N and S Khandelwal. 2020. Implementation of CSR in the Oil and Gas Industry: issues and approaches. Details available at <https://www.researchgate.net/publication/343713432>

Padhy, S P, S N Pathi (Professor), B Patra (Professor), and S K Pradhan. 2019. Evolution of CSR in the Changing Scenario: A Review. *International Journal of Financial Management and Economics* **2** (1): 76–79

Thacker, H and A Bhattacharya. 2025. Top 100 Companies for CSR and Sustainability in 2024. The CSR Journal. Details available at <https://thecsrjournal.in/>

The Companies Act, 2013. Government of India. Details available at <https://www.indiacode.nic.in/bitstream/123456789/2114/5/A2013-18.pdf>

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*In 2024, DSHQ achieved the prestigious LEED Platinum certification under the USGBC's LEED v4 for Existing Buildings: Operations + Maintenance (O+M) programme, securing an exceptional 109 out of 110 credits.
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Building Tomorrow: A Climate Manifesto

In steel and stone, in glass and beam,
Lives our collective urban dream.
In drawn blueprints and concrete poured,
Sustainability must be explored.

As the climate's fury grows each year,
Our buildings must adapt with care.
Designed for floods, heat, and storm—
Resilience is the new building norm.

For true resilience starts with design
And ends when materials realign.
From cradle to cradle, not to grave,
We need to circulate materials and save.

In retrofits bold and new construction,
Innovation drives emissions reduction.
Not towers built on fossil fuel,
But structures aligned with nature's rule.

In cities where the future grows,
Where human need and nature flows,
These buildings stand as hope made real,
Together, learning how to heal.

Smart sensors read the changing weather,
While concrete heals its cracks together.
Biophilic spaces bring life in,
Where human wellness can begin.

Plants and light and natural views
Help productivity renew.
Innovation and action, brick by brick,
Can make our buildings climate-thick.

But only if we build today
With courage showing us the way.
For in the end, what we create
Will seal our planet's destined fate.

So build with hope, and build with care,
A liveable world is what we dare.

Shuchi Malhotra

Director at Deloitte specializes in ESG, decarbonization, and carbon markets

6th GRIHA Regional Conclave

Bhubaneswar | 25 March 2025

Keynote Address by Shri Babu Singh, MLA, Ekamra Bhubaneswar Constituency

Special Address by Shri Rajesh Prabhakar Patil, IAS, Commissioner, Bhubaneswar Municipal Corporation, and Special Secretary, Housing and Urban Development Department, Government of Odisha

Welcome address by Shri Sanjay Seth, Vice President and Chief Executive Officer, GRIHA Council and Senior Director, The Energy and Resources Institute (TERI)

Signing of Memorandum of Understanding (MoU) between GRIHA Council and Siksha 'O' Anusandhan, Odisha, to foster knowledge exchange, research, and capacity building, promoting green building design and climate-responsive urban planning

Shri Akash Deep, Deputy General Manager and Treasurer, GRIHA Council; Ar. Ruchipurna Jena, Founder, Prakriti Architects, Bhubaneswar; Shri Bijoy Tripathy, Chairman, Indian Building Congress; Shri Prof. (Dr) K. Mohan, Head and Dean, Faculty of Architecture, Sri Sri University, Cuttack; Shri Prof P. Dinakar, Dean, Sponsored Research and Industrial Consultancy (SRIC), School of Infrastructure, Indian Institute of Technology (IIT) Bhubaneswar and Shri Sheikh Mairajul Haque, Co-Founder and Director, Acrerise, (Member, CREDAI) (From L to R) during the session 'Smart Building Service For Net Zero Future'

Tree Evapotranspiration and its Influence on Building Latent Cooling Loads in Hot and Dry Climate

A case study of Ahmedabad, India

Ayush Mandviya

is Architect by profession with master's degree in Building Energy Performance from CEPT University. He is actively involved in green building certifications with professional credentials as an IGBC AP and LEED GA.

Dr Rajan Rawal

is Professor at CEPT University and Senior Advisor at the Center for Advanced Research in Building Science and Energy (CARBSE), CEPT Research and Development Foundation (CRDF).

This article, contributed by **Ayush Mandviya, Professor Rajan Rawal,** and **Subham Das,** is an extension to our awareness on urban heat island effect (UHIE). The trio makes us realize how increasing urban tree canopy can help us suitably address the adverse effects of the UHIE. Inclusion of a case study from Gujarat, India imparts practicality to the suggested solutions of overcoming UHIE.

Subham Das

is Senior Research Associate at the Centre for Advanced Research in Building Science and Energy (CARBSE), CRDF, CEPT University. His research focuses on urban climate, thermal comfort, and building energy efficiency.

India's rapid urbanization, with 470 million urban residents accounting for 34% of population, exacerbated challenges such as air pollution and urban heat island effect (UHIE) (Coleman 2018), have a consequential impact on urban liveability and sustainability. The UHIE is the phenomenon where urban areas experience higher temperature than nearby rural areas. Its primary drivers include reduced green cover, surface heat retention, and anthropogenic heat release, which elevates urban temperatures, compromise thermal comfort, and increase cooling energy demand in buildings (Rizwan, Leung, Dennis *et al.* 2008).

In response, green infrastructures such as interlinked open (green) spaces, parks, and green corridors are gaining traction for improving outdoor thermal comfort by providing shade, and enhancing latent cooling from evapotranspiration (Menon and Sharma 2021), thus lowering ambient temperature (Fahmy 2009).

Also, urban tree canopy is increasingly recognized as an integral part of climate action plans for reducing greenhouse gas emissions (Winbourne, Joes, and Garvey 2020). However their cooling efficiency varies with tree characteristics, microclimatic conditions, and urban morphology (Li, Zhao, Wang, *et al.* 2024). Additionally, they can adversely affect (rebound effect) the surrounding microclimate by increased humidity due to a lack of scientific and evidence-based planning including selection of appropriate, native species and their strategic placement, reducing its cooling benefits particularly in low-wind conditions.

Evapotranspiration, the process through which water gets absorbed by roots and is released via leaf stomata, is significant to vegetation-driven cooling (Jain, *n.d.*). This mechanism, regulated by soil moisture, solar radiation, and leaf anatomy, contributes to reduction of leaf surface temperature while influencing the microclimate beneath their canopy. The magnitude of this cooling effect is species dependent

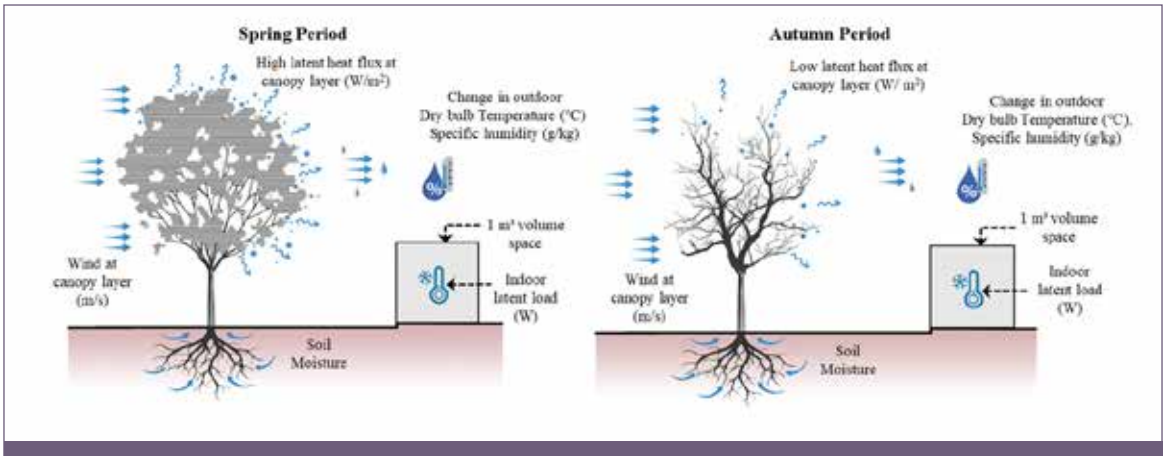


Figure 1 *Effect of the seasonal evapotranspiration variation of trees on the latent cooling load*

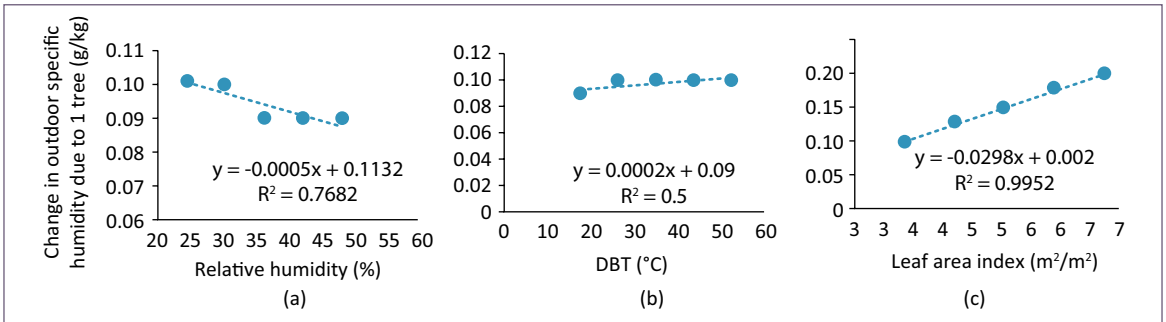


Figure 2 *Sensitivity analysis for neem tree*

including their anatomical, structural, and physiological attributes (Gupta, Ram, Singh, *et al*. 2018) and sensitive to meteorological factors, such as air temperature, relative humidity, and wind speed (Akbari, Kurn, Bretz, *et al*. 1997). Hence, there is a need for a research study being discussed in this article that can investigate seasonal variation in the evapotranspiration rates of native trees and its impact on the building's latent cooling loads, in hot and dry climate of Ahmedabad.

Seasonal variations in microclimate significantly impact building energy performance, particularly in regions like Ahmedabad with pronounced cooling demands. Native tree species like neem, banyan, and ashoka through their phenological and physiological cycles, modulate, evapotranspiration rate that may play a vital role in mitigating these impacts, but may also impact the building's latent cooling loads. It is important to identify native tree species and analyse their physical and physiological characteristics to quantify the seasonal latent heat flux at the canopy layer. By evaluating the seasonal influence of these processes on indoor latent cooling loads, we could get insights that support evidence-based urban planning and energy-efficient building design.

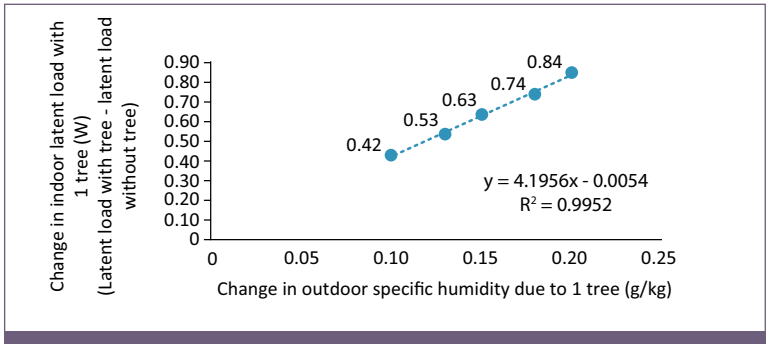


Figure 3 *Correlation between change in outdoor specific humidity and the change in indoor latent load due to single tree at constant outdoor DBT and RH*

It is vital to integrate computation fluid dynamics (CFD)-based microclimate simulations and mathematical models based on literature and 3D tree modelling data. Tree geometry is processed using the 'Albero toolbox' in ENVI-met (a non-hydrostatic, CFD-based 3D modelling tool) to determine the leaf area ensity (LAD) and compute leaf area index (LAI). Further the latent heat flux at the canopy level is evaluated by the fast-all-season soil strength (FASST) vegetation model (Frankenstein and Koenig 2004) while the indoor latent cooling load calculations are guided by ASHRAE Fundamentals (ASHRAE 2021).

The study investigates the influence of indigenous tree species on indoor latent cooling loads in Ahmedabad, India, having a hot and dry climate. Focusing on ten mature tree species, and its phenological characteristics the impact on the indoor latent cooling load is analysed for a defined volumetric space under steady-state conditions. The analysis is based on nine representative conditions derived from the Indian Model for Adaptive Comfort (IMAC) for

air-conditioned spaces, considering average dry bulb temperature and relative humidity (Manu, Shukla, Rawal, *et al.* 2016).

The findings of the study underscore critical interdependence between the outdoor environmental parameters, tree characteristics, and variations in indoor latent cooling load. The assessment revels that evapotranspiration rate of individual trees quantified through LAI as a proxy for crown density, has a significant correlation with ambient moisture levels (R^2= 0.9952). Moreover, changes in humidity due to, their seasonal calendar directly impact both the outdoor microclimate and indoor humidity levels, with downstream implications for building energy consumption, particularly in latent cooling demand.

Therefore, as a practical implementation climate-responsive urban greening guidelines should consider contextual environmental conditions and tree traits like their typology and LAI, to avoid canopy overcrowding and unintended impact on indoor latent cooling loads. Further, integrating real-time microclimatic impact, influenced by vegetation into smart building systems can optimize energy efficiency and occupant comfort. Therefore, this study ensures that embedding evapotranspiration into urban microclimate and building energy simulations, can aid in enhancing climate-responsive urban planning and design, promoting a healthier and more resilient urban built environment.

References

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE). 2021. *Handbook Fundamentals* (SI). ASHRAE

Akbari, H, A, M Kurn, S E Bretz, J W Hanford.1997. Peak Power and Cooling Energy Savings of Shade Trees. *Energy and Buildings*. Elsevier

Coleman, J. 2018 (September). India's Urbanisation Challenge. Oxford Policy Management

Mohamad, F. 2009 (July). *Dual Stage Simulations to Study the Microclimatic Effects of Trees on Thermal Comfort in a Residential Building*. Cairo, Egypt

Frankenstein, S, and G Koenig. 2004. FASST Vegetation Models. Defense Technical Information Center

Gupta,S K, J Ram, H Singh, and P Kumar. 2018. Comparative Study of Cooling under Shades of Some Forestry Tree Species with Respect to Ambient Temperatures. *Journal of Geoscience and Environment Protection*

Jain, S. K. *n.d*. Evapotranspiration. National Institute of Hydrology Roorkee, India

Li, H, Y Zhao, C Wang, D Ü Vorsatz, J Carmeliet, and R Bardhan. 2024. Cooling Efficacy of Trees across Cities Is Determined by Background Climate, Urban Morphology, and Tree Trait. EGUsphere [preprint]

Manu, S, Y Shukla, R Rawal, L Thomas, and R D Dear. 2016 Field Studies of Thermal Comfort across Multiple Climate Zones for the Subcontinent: India model for adaptive comfort (IMAC). *Building and Environment*

Menon, J, R Sharma. 2021. Nature-Based Solutions for Mitigation of Air Pollution and Urban Heat in Indian Cities. *Frontiers in Sustainable Cities*

Rizwan, A M, Leung Y C Dennis, and C Liu. 2008. A Review on the Generation, Determination and Mitigation of Urban Heat Island. *Journal of Environmental Sciences* **20**

Winbourne, J B, T S Joes, S M Garvey, *et al.* 2020. Tree Transpiration and Urban Temperatures: Current Understanding, Implications, and Future Research Directions. *BioScience* **70**

Exhibition titled 'Sanchay: An Exploration Through Centuries and Beyond' was inaugurated by Ms Martine Aamdal Bottehiem, Deputy Head of Mission and Minister Counsellor, Royal Norwegian Embassy in the presence of other eminent dignitaries during the inaugural session

16th GRIHA Summit 2024

Inaugural session of the exhibition titled 'Sanchay: An Exploration Through Centuries and Beyond' in the presence of eminent dignitaries

Delivering the valedictory address, Smt. Meenakashi Lekhi, Former Minister of State for External Affairs and Culture, Government of India and Member of Parliament

GRIHA Council signed MoU with Kendriya Vidyalaya Sangathan, Ministry of Education, Government of India during the inaugural session

Lighting the lamp at the inauguration of the 16th GRIHA Summit

Welcome address by Dr Vibha Dhawan, President GRIHA Council and Director General, TERI

Release of the GRIHA annual magazine *Shashwat - Let Nature Be* in the presence of eminent dignitries

Felicitation of rated projects during the GRIHA Summit

Thematic Session chaired by Dr Dhruba Purkayastha, Director, Growth and Institutional Advancement, CEEW; Mr Saurabh Diddi, Director, BEE; Ms Neha Khanna, Senior Manager, Climate Finance, Climate Policy Initiative; Ms Rachika A. Sahay, Equity Partner, Argus Partners; Mr Sandeep Sonigra, Managing Director, Orange County Group; Mr Zohaib Siddique, Senior General Manager - Architecture & Design, Whiteland Corporation and Mr Archit Batra, Head - New Business Initiatives, FCF India

Plenary Session chaired by Mr Manjeev Singh Puri, Distinguished Fellow at TERI; Dr Sukhgeet Kaur, DDG (Cost) & Adviser (Energy), Ministry of Defence of India; Mr Anshul Tewari, Founder & CEO, Youth Ki Awaaz; Mr Shailesh Ranjan Gupta, Business Head, Asahi India Glass Limited (AIS); Mr Vaibhav Gupta, Associate Director, KPMG India and Mr Prabhakant Jain, Head of CSR, DS Group

Felicitation of the winners of GRIHA NASA Trophy

Release of GRIHA Infrastructure Rating for Highways

Climate Resilience for Sapiens

Via this article, composed by **Sunanda Satwah,** warns us about consequences of our actions in relation to our existence on the Earth. She stresses, designing for a climate-resilient world is a multi-pronged approach, with far-reaching impacts; it entails having well-thought-of, action-based, long-term plans that transcend personal, financial or political gains, and think about the planet. It is paramount that each individual, within their own capacity, contributes to caring for the environment. The author opines, it is the everyday small acts of mindful-awareness which have the potential to bring about long-lasting positive change.

Sunanda Satwah

is an environmental architect, educator, and writer. She is a GRIHA Evaluator and GRIHA-CP; also an IGBC-AP & FSAI-AP. Her firm SUNARCS specializes in architectural journalism, health care design, and green consultancy.

The Earth is climate-resilient alright. In the 4.5 billion years of its existence it has been through several periods of alternating ice ages and hot ages. During its early years it was much hotter than it is now. The Earth is no stranger to these cyclic icehouse and greenhouse periods; the last of which was around 11,700 years ago towards the end of the Pleistocene Epoch. The time we are living through, the Holocene, is an interglacial period, that is, a warmer period between two glacial periods. This should have sufficiently highlighted that the Earth and Mother Nature are sufficiently resilient.

The Cambridge Dictionary defines the term as follows:

Resilient *(adjective): able to quickly return to its usual shape after being bent, stretched, or pressed.*

Earth Doesn't Need Us: we need Her more than She us

It is evident that the Earth is resilient enough and does not need taking care of. The true question here is: is the world we live in, resilient enough for the human race to survive? The emergence of Homo Sapiens on Earth is relatively recent. Human existence of 3,00,000 years as compared to the life of Earth is equivalent to arriving a few seconds before midnight in a 24-hour day. On this magnificent blue planet, Homo Sapiens are but an insecure toddler. We are aware of the grand dinosaurs and mammoths having gone extinct. This fear and quest for survival has prompted

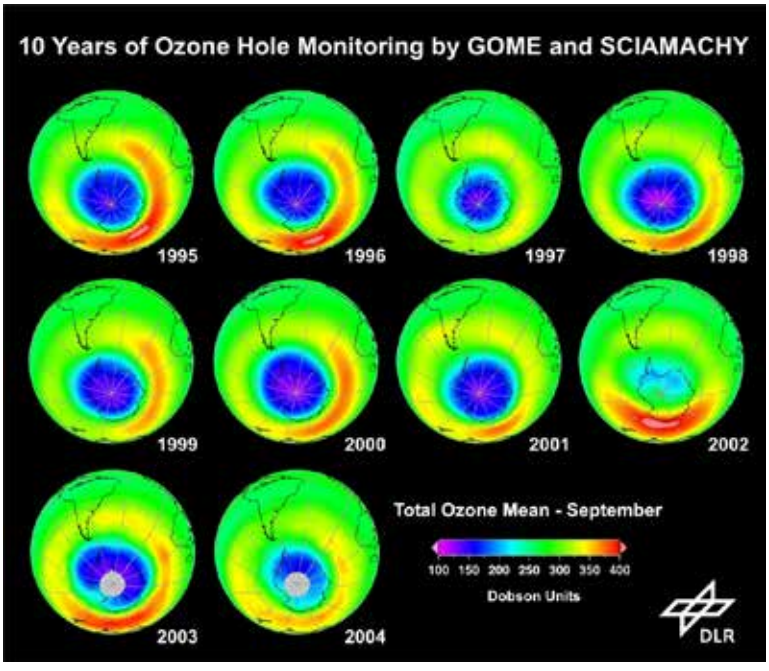
humans to experiment, destruct and course-correct. We are aware that the Earth will survive climate change, our concern is: will we?

Action-based Outcomes

The Ozone Hole

One of the most successful examples of human intervention in reversing climate destruction has been the healing of the Ozone Hole.

The thinning of the Ozone Layer had been recorded since mid-1970; but was officially declared as Ozone Hole over Antarctica in 1985. Two years after the findings were published, United Nations Environment Programme (UNEP) adopted the Montreal Protocol in 1987 to phase-out the production and consumption of ozone-depleting substances such as chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and halons; which were being used in air conditioning, refrigeration, aerosols, and foam generation. Owing to the collective world-wide ban and committed human action, the Ozone Hole has been healing, with the National Aeronautics Space Adminstration (NASA) scientists estimating a full recovery by 2066. This action-based policy has been considered as one of the best success stories amongst international environmental treaties. It goes to show that despite our foibles, when humans determine to course-correct, with appropriate action and enough time, anything is possible.



The Great Green Wall

Another ambitious initiative being undertaken to tackle desertification, land degradation, and loss of biodiversity, through an integrative approach, is the development of the Great Green Wall across North Africa, adjoining the Sahara Desert. The ambitious project spreads across 11 countries, spanning approximately 8000 km, and covering an expanse of 110 million hectares, aims to sequester 250 million tonnes of carbon dioxide. The initiative was launched in 2007 by the African Union and was anticipated to be completed by 2030. However, it has achieved only 30% completion by 2024, due to various political and bureaucratic reasons.

Good Intentions Gone Awry

We cannot always predict the outcomes of our actions, especially in projects with far-reaching effects and long-time frames spanning several years or even centuries. For instance, Romans, the inventors of the plumbing system that gave us the convenience of tap water, initially used plumbum or lead for water supply pipes, as did people world-over for thousands of years; they were unaware about lead's neurotoxicity; and inadvertently suffered the health effects until its prohibition in 1986. In the USA, under Safe Drinking Water Act, the regulations have instructed, in 2024, the removal of all lead plumbing lines within the next decade. India however, has not yet declared a fixed goal despite National Green Tribunal's (NGT) appeal for an action-based phase-out plan. Many in India and across the globe are resigned to drinking dangerous water, either due to lead pipes laid several hundreds of years ago, or by consuming groundwater that may be high in arsenic content. Eighty per cent of India's population relies on groundwater, including 60% that goes towards irrigating arable land. At 25% global ground water extraction, we are also the heaviest users of groundwater in the world.

Water woes abound in our country. India continues to be an agrarian economy that relies on seasonal rainfall and groundwater for its day to day needs. Climate-resilient agricultural farms, industries, and societies entail that we invest in better water management for irrigation and consumption. It also necessitates that our states discard policies which encourage water wastage, such as growing paddy in the soil of Punjab which is better suited for wheat and indigenous crops. The water footprint for wheat is one-fourth of rice. Whereas, it takes about 1000 litres to produce 1 kg of wheat; it takes about 4000 L of water to produce 1 kg of rice.

2024's Big Reveal

From a climate-impact perspective, the end of the year 2024 delivered two dramatic revelations:

- The Earth's axis has tilted eastwards by 31.5 inches (80 cm). The reason being: rising water demand and resultant groundwater extraction in North America and India. This is a stark example of the impact anthropogenic activities can have on the planet's dynamics; and has the potential to contribute to sea-level rise and climatic fluctuations.
- 2024 was recorded the hottest year; having already exceeded the 1.5˚C temperature threshold, which was anticipated to be met in 2030, as per COP21, Paris Agreement. The rising temperatures do not bode well for the future, and will expose people and the environment to extreme heat.

We have to brace ourselves for future calamities that shall require active interventions.

Conclusion

Designing for a climate-resilient world is a multi-pronged approach, with far-reaching impacts; it entails having well-thought-of, action-based, long-term plans that transcend personal, financial or political gains, and think about the planet as:

'वसुधैव कुटुम्बकम'

Meaning: 'The world is one family'

It is paramount that each individual, within their own capacity, contributes to caring for the environment. It is the everyday small acts of mindful-awareness which have the potential to bring about long-lasting positive change.

Every (contributed) drop makes an ocean, while, every (extracted) drop makes the earth tilt.

To quote Albert Einstein,

"We cannot solve our problems with the same thinking we used when we created them."

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Prithvi Rakshati Rakshita

Ancient wisdom for a sustainable and resilient future

This article reaffirms that sustainability is a way of life, embedded in our lifestyle. The author, **Motcha Pradha Ramagopal,** illustrates that roots of sustainability stretch back through millennia, woven into the very fabric of daily life for countless generations. Aligning our collective actions with nature's fundamental principles is the only path that can truly pave the way for a healthier, more resilient, and genuinely sustainable future for everyone.

Take a moment to close your eyes and imagine a time when every breath you took, every meal you ate, every action you performed, was intertwined with a profound respect for the Earth. A time when our ancestors, not so long ago, lived in a dance with nature, not in defiance of it. This isn't a fantasy, it's the echoes of a wisdom that has always been there, a wisdom that we, in our frantic modern lives, are finally beginning to remember.

Motcha Pradha Ramagopal

is Director at Jwala Risk Consulting, a passionate professional in environment and sustainability with over 14 years of global experience across the UK, Africa, Middle East, and India. She specializes in climate resilience, ESG reporting, EIA, and sustainable infrastructure.

Sustainability isn't a new, trendy buzzword. Its roots stretch back through millennia, woven into the very fabric of daily life for countless generations. Think of the ancient Indian traditions, for instance, where sustainable practices weren't just good ideas they were the very bedrock of existence. Communities didn't just coexist with nature; they lived in profound harmony, guided by principles that championed balance and preservation.

Imagine a world where the *Panchabhutas*, the five elements of earth, water, fire, air, and space weren't just abstract concepts, but living, breathing deities to be revered. This reverence was foundational to their way of life, leading to practices that we're only now frantically trying to re-learn: zero-waste living, the meticulous and judicious use of every natural resource, and a consistent, positive impact on the environment.

Image 1 *Sustainability is in living in harmony with nature*

Their agricultural methods were a masterclass in living with the land, not against it. Crop rotation wasn't a scientific theory; it was intuitive wisdom. Organic fertilizers were simply how things were done, and water harvesting wasn't a luxury, but a necessity, ensuring fertile soil and sustainable food for generations to come. But it went deeper than material practices. The principle of ahimsa non-violence extended not just to fellow humans, but to every living creature, fostering a profound respect for nature in all its forms. These time-tested practices weren't just about survival; they were about ensuring prosperity for future generations. As the ancient sage Chanakya wisely stated, *"Prithvi rakshati rakshita."* The Earth protects those who protect it. What a powerful, reciprocal truth that rings truer now than ever before.

Today, as we face the stark realities of unprecedented environmental degradation, the whispers from the past offer us invaluable lessons. The wisdom embedded in those age-old ways isn't just quaint history; it's a powerful blueprint for shaping a truly sustainable future, for each of us as individuals, and for the vast, complex organizations that shape our world. Let's bring this down to our everyday lives. For us, as individuals, embracing sustainable practices isn't a sacrifice; it's an enhancement to our quality of life. Think about it: choosing organic food, consciously stepping away from the endless allure of processed goods, and opting for natural products isn't just good for the planet; it minimizes our exposure to harmful chemicals, leading to a healthier, more vibrant you. Mindful consumption, that quiet practice of repairing a beloved item instead of tossing it, or actively reusing something until it can truly give no more, cultivates a sense of gratitude and presence in our often-hurried lives.

Image 2 *Essence of sustainability lies in realizing balance and preservation*

And then there are the beloved 3 R's: Reduce, Reuse, and Recycle. They might sound like something from a school lesson, but imagine the cumulative impact if each of us truly lived by them. Less waste, conserved resources, a lighter footprint. Even seemingly small acts, like adopting renewable energy where possible, practising composting your kitchen scraps, or simply being mindful of your overall energy usage, aren't just

Image 3 *The Earth protects those who protect it*

eco-friendly; they lead to tangible financial savings and foster a deeper sense of balance in your interaction with the planet. Ultimately, living sustainably isn't just about saving the Earth; it's about aligning ourselves more closely with nature, which, in turn, helps reduce stress and improve our overall well-being. It's a win–win, truly.

But the responsibility doesn't just rest on our individual shoulders. Organizations, from the smallest local business to the largest multinational corporation, also play an absolutely critical role in fostering sustainability. By truly embedding comprehensive eco-friendly strategies into their DNA, they aren't just mitigating environmental risks; they're creating significant, long-term value for everyone involved their employees, their customers, their communities, and even their shareholders.

Imagine a world where businesses embrace the circular economy, where products are designed to be reused and recycled, where waste is not an inevitable byproduct but a design flaw to be eliminated. Aggressive waste reduction and maximizing energy efficiency aren't just ethical choices; they are paramount in minimizing their environmental footprints and, quite frankly, smart business. Partnering with local vendors, optimizing logistics to reduce emissions these are tangible steps towards a greener future. And beyond the environmental, implementing ethical policies and robust mental health programmes strengthens workplace culture, making organizations more resilient, more attractive to talent, and ultimately, more successful. These concerted efforts don't just enhance an organization's reputation; they ensure a truly fool-proof approach to modern business, building a foundation that can withstand the storms of the future. The truth is, incorporating these proven principles into our modern lives isn't just an option anymore; it's a necessity. It's the only way to effectively address the complex environmental challenges that stare us down every single day. Aligning our collective actions with nature's fundamental principles isn't a quaint ideal; it's the only path that can truly pave the way for a healthier, more resilient, and genuinely sustainable future for everyone, for generations to come.

And this brings us to a crucial concept, resilience. Think of resilience as building a strong, unwavering wall. When it comes to climate resilience, we, as responsible citizens of Mother Earth, must cultivate a strong and unbreakable bond with nature. It's about learning to 'live and let live' in true harmony. Here's the truly hopeful part, climate resilience doesn't demand highly innovative or complex actions. In fact, it thrives on simplicity, on thoughtfulness, and most crucially, on the conscious choices we make in our daily lives. It's in the small shifts, the mindful decisions, and the quiet reverence for the wisdom of the past that we find the greatest power to build a truly resilient and sustainable future. The answers aren't hidden in a lab; they're often right there, in the echoes of ancient wisdom, waiting for us to listen.

What small, conscious choice can you make today to build a stronger bond with nature?

Whispers from the Balcony

Gazing from my balcony high,
The skyline blurred against the sky.
A sultry haze wrapped dawn in gray,
Felt like a foggy winter day.

Wiped my eyes, confused by heat,
Yet no sky, bird, or street.
Only smog and gloom reigned,
Where horizons once were unrestrained.

Remembering the still and peaceful hour,
When the world had lost its usual power.
When locked inside homes, we stayed,
Nature bloomed while chaos swayed.

Back then, the skies were clear and blue,
The stars at night would twinkle through.
Just like the days of yore
No smoke, no noise, just nature's lore.

Oh Lord, why not once more aloud you say,
"Stop, slow down, change your way!"
To pause greed and the endless chase,
And give Mother Earth some breathing space.

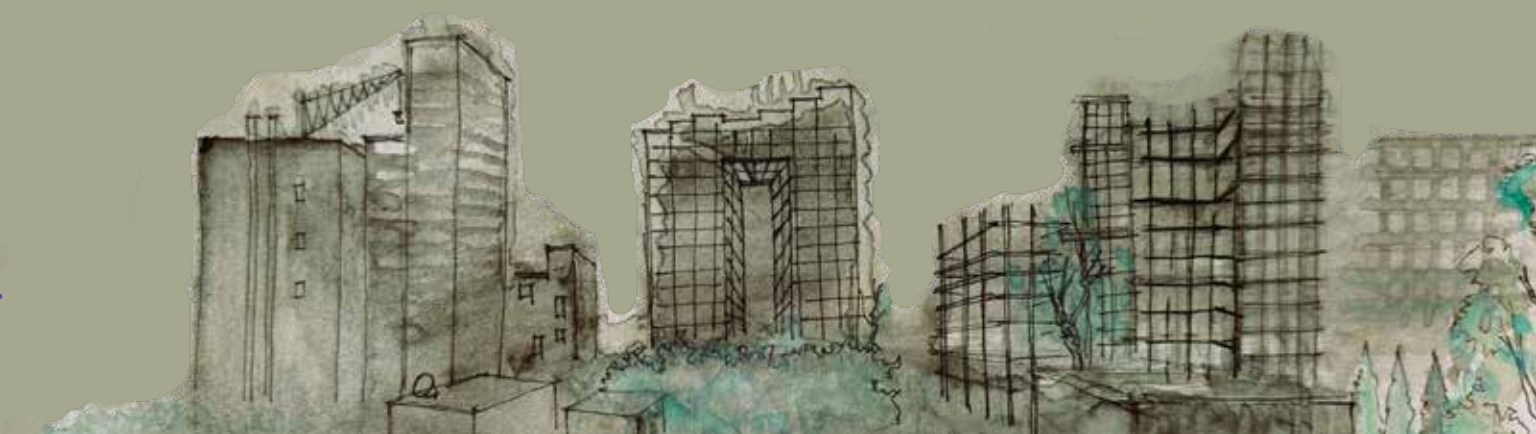
For once, having scarred her flesh and core,
Taken too much, asking even more.
She weeps beneath our roads and mines,
Our cities rise while she declines.

No healer can now mend her soul,
She's breaking under human toll.
Lord, please bind us where we are,
Not for fear, but peace at large.

Shield her heart, calm her cries,
Don't let her dim 'neath grieving skies.
If none can save her from our flaws,
Then tame the beast by nature's laws.

Dr Gunjan Jain
Architect and Environmental Planner, School of Planning and Architecture, Delhi

Dr Shuvojit Sarkar
Associate Professor, School of Planning and Architecture, Delhi



Climate Cost of Wanderlust: Rethinking bucket lists in a warming world

Srishti Gaur,
Senior Project Officer, GRIHA Council

Everyone loves to travel, so do I !!

A trip to the Gili Islands, a small cluster of Indonesian isles nestled between Bali and Lombok, was meant to be another checkmark on my ever-growing travel list. Yet, what I found there wasn't just turquoise waters and white sand beaches, it was a powerful reminder that sustainable living isn't just possible, it can be deeply fulfilling.

The Gili Islands, Gili Trawangan, Gili Meno, and Gili Air, offer more than scenic beauty. They present an inspiring model of how tourism and sustainability can coexist. From the moment I stepped off the boat, I noticed the absence of something we take for granted in most parts of the world: motor vehicles. No cars, no scooters. Transportation here is limited to bicycles, horse-drawn carts, and the most reliable of all - your own feet. This choice isn't just charming; it's a conscious effort to preserve the delicate ecosystem and reduce carbon emissions on the islands.

Meals were another revelation. Most of the food served is locally sourced, fresh seafood, tropical fruits, and traditional Indonesian dishes dominate menus. Dining at beachfront cafés, I realized how food sustainability and local employment go hand in hand. It's a slow, grounded experience, nothing like the hurried, globalized convenience that characterizes modern travel hubs.

The community, too, plays a critical role. Locals actively engage tourists in environmental practices, beach clean-ups, coral restoration workshops, and educational programs on marine conservation are common. The message is clear: as visitors, we are stewards, not just spectators.

In a world where over-tourism and frequent flying contribute significantly to climate change, the Gili Islands offer a compelling alternative. They are not immune to the impacts of warming oceans and rising tides, but they are meeting the challenge with thoughtful, localised solutions.

This experience forced me to reflect on my travel choices. The pursuit of far-off destinations should not come at the planet's expense. If every traveller chose destinations like the Gilis, not only for their beauty but for their values, we could shift from extractive tourism to regenerative travel.

Wanderlust doesn't need to disappear, but it must evolve. In this warming world, let our bucket lists be shaped not just by where we dream to go, but by how responsibly we choose to get there.

Blog

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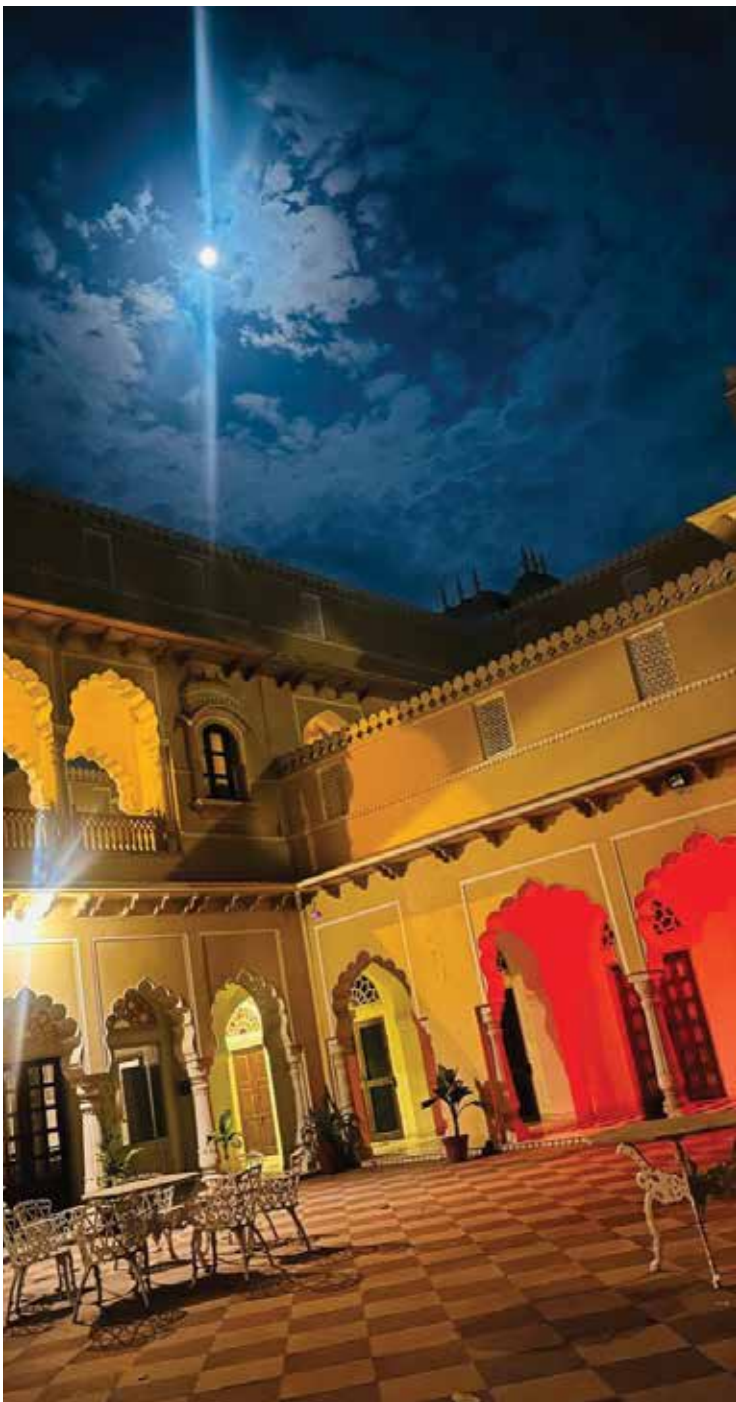

Powering India's Low-carbon Future

Bioenergy and cluster-based waste management solutions

Via this piece writing, **Kriti Sharma** brings to our conscience—waste-to-energy is not just a technology, it's a strategic intervention. For India, advancing the cluster-based implementation of bioenergy systems presents a compelling opportunity to simultaneously address environmental, energy, and public health challenges. In doing so, it can power India's low-carbon future with solutions rooted in local economies, decentralized governance, and long-term sustainability.

Kriti Sharma

is Associate Fellow at The Energy and Resources Institute (TERI), has six years of experience in working on topics gyrating around Indian and international energy scenarios, energy transition, and energy policy.

India's renewable energy transition is making significant strides, led primarily by solar and wind power. Yet, bioenergy despite its vast potential remains relatively underutilized. As of 31 March 2024, bioenergy and waste-to-energy (WtE) together account for just 8% of the country's grid-connected renewable energy capacity (MNRE 2025).

Bioenergy encompasses a wide range of biomass sources and conversion technologies. For a country with an agrarian economic base, there is untapped potential in agricultural residues, livestock waste, and biodegradable materials such as domestic food waste, municipal solid waste, and organic industrial by-products. If effectively harnessed, these could serve as significant sources of energy for cooking, electricity, and transport, contributing meaningfully to India's commitment to achieve net-zero emissions by 2070.

India's challenge with waste management is compounded by prevailing linear consumption patterns that result in inefficient resource use and environmental challenges. Converting organic waste into energy addresses multiple goals simultaneously: managing waste sustainably, reducing pollution, enhancing energy access, and supporting climate resilience.

Recognizing this, the Government of India has introduced several targeted initiatives to catalyze the bioenergy ecosystem. These include the National Policy on Biofuels, the Galvanizing Organic Bio-Agro Resources Dhan

(GOBAR-DHAN) scheme, the National Bio-Energy Programme (NBEP), and the Sustainable Alternative Towards Affordable Transportation (SATAT) initiative. Each of these policies is closely aligned with India's broader goals of climate action, rural development, and sustainable urbanization.

Launched in October 2022 by the Ministry of New and Renewable Energy (MNRE), the NBEP is being implemented for the period from 1 April 2021 to 31 March 2026. The programme includes three key sub-schemes:

1. **WtE:** targeting energy generation from urban, industrial, and agricultural waste.
2. **Biomass programme:** supporting the manufacturing of briquettes and pellets and promoting non-bagasse-based co-generation.
3. **Biogas programme:** enabling installation of small and medium-scale biogas plants (1 m^3 to 2500 m^3/ day) for users including farmers, cooperatives, slaughterhouses, dairies, and industrial units.

A particularly promising approach under the WtE sub-scheme is the emerging model of cluster-based implementation. This model is being increasingly adopted by states and cities to address scalability, viability, and operational efficiency challenges. By aggregating waste from multiple neighbouring towns, cluster-based facilities can optimize feedstock supply, reduce transportation costs, and improve plant performance.

A strong example is the centralized bio-methanation plant in Indore, Madhya Pradesh, which processes organic waste not only from Indore but also from nearby towns such as Dewas, Mhow, and Rau. The benefits of such an approach include shared capital investment, avoidance of infrastructure duplication, improved plant load factor, and generation of local employment through decentralized, community-led operations.

Another such example is that of a collaborative initiative of Jabalpur Cooperative Milk Union and Jabalpur (Madhya Pradesh) Smart City Limited. A 150-TPD plant which runs on hybrid revenue sharing (capex by government) model, generates 2400 kg/day of BioCNG, 28 tonnes/day of organic manure and 74 tonnes/ of bio slurry (liquid). It was setup in 2023 to address the challenges of unmanaged cow and buffalo dung from nearby dairies which were a major cause of pollution in rivers like Pariyat Hiran, and ulimately Narmada. It not only helps the city to manage 55,000 metric tonnes

Image 1 *A modern WtE facility in Indore*

Image 2 *Biogas plant processing organic waste into renewable energy and bio-fertilizer*

(annually) of dung but also reduces water pollution.

From a climate-resilience standpoint, this model helps curb GHG emissions from open dumping, stubble burning, and overburdened landfills. It also supports improved urban sanitation and contributes to decentralized renewable energy access. Each tonne of organic waste processed through bioenergy solutions avoids approximately 1,800 kg of CO_2 equivalent emissions and can produce 40–70 m^3 of biogas, demonstrating a tangible climate dividend.

Globally, over 2,700 WtE plants are operational, more than 500 in Europe, 900 in China, and 400 in Japan. In comparison, India currently operates around 110 WtE plants, with significant room for expansion. Despite generating approximately 160,000–170,000 tonnes of municipal solid waste per day, India's WtE infrastructure currently serves just about 70 cities.

The potential is immense, estimates suggest that WtE plants could generate up to 3,000 MW of electricity across more than 400 Indian cities. Beyond energy, these systems offer a scalable, circular economy-aligned solution to India's growing urban waste challenge.

WtE is not just a technology, it's a strategic intervention. For India, advancing the cluster-based implementation of bioenergy systems, especially under the National Bio-Energy Programme presents a compelling opportunity to simultaneously address environmental, energy, and public health challenges. In doing so, it can power India's low-carbon future with solutions rooted in local economies, decentralized governance, and long-term sustainability.

7th GRIHA Regional Conclave

Bengaluru | 20 June 2025

Inaugural Address by Shri Dinesh Gundu Rao, Hon'ble Minister for Health and Family Welfare Department, Government of Karnataka

Special Address by Smt. Janet Joseph, Lead – Corporate Social Responsibility (Practice), Mercedes-Benz Research and Development India (MBRDI)

Welcome Address by Shri Sanjay Seth, Vice President and CEO, GRIHA Council and Senior Director, Sustainable Infrastructure Programme, TERI

Smt. Shabnam Bassi, Deputy CEO and Secretary, GRIHA Council and Director, Sustainable Buildings Division, TERI; Shri Dinesh Gundu Rao, Hon'ble Minister for Health and Family Welfare Department, Government of Karnataka; Shri Sanjay Seth, Vice President and CEO, GRIHA Council and Senior Director, Sustainable Infrastructure Programme, TERI; Shri Rajesh Jha, Country Environment and Sustainability Manager, ABB India Limited and Smt. Janet Joseph, Lead – Corporate Social Responsibility (Practice), Mercedes-Benz Research and Development India (MBRDI) (from L to R) during the lighting lamp ceremony

Shri Anupam Buttan, Senior Manager, GRIHA Council, New Delhi; Smt. Snehal. R, IAS, Bruhat Bengaluru Mahanagara Palike (BBMP) Zonal Commissioner (East); Smt. Shobha Raghavan, CEO SaahasZero Waste; Smt. Nalini Shekar, Co-founder of Hasiru Dala; Shri Pushkara S V, Senior Manager, Indian Institute for Human Settlements; Dr Manjunatha L R, Vice president and Head - Business Development and Specifications, JSW Cement and Shri Gopinath U, Sustainability Manager, Saint - Gobain India Private Limited – Glass Business (from L to R) during the session 'Waste Not, Want Not: path to sustainable waste management'

Leaf Me Be

Sunanda Satwah
Environmental Architect,
Educator, and Writer, GRIHA
Evaluator and GRIHA-CP

Now, I am brown and brittle-
Ready to snap with a twist,
Crumbling in to nothingness
Were you to tug me with your wrist.
The skies have shown no mercy,
There has been no rain-
Yet the memory lives
Of it flowing through my veins!

I was once a leaf-
Healthy and green.
Swaying in the wind,
Regaled by rain- pristine.
Seduced by the scent of damp earth,
Gurgling water trickling down the tree-
The croaking of frogs and the cicadas
Never thought I would miss their blasted cacophony!
Oh! the songs of nightingales, robins and treepies
I could not have my fill;
Gazing at the moon, glistening in the sun,
Beaming with green love, my heart was full of chlorophyll.

I hoped to shed one day-
Landing at Mother Earth's feet,
Kissing her one last time
To decompose is not defeat.
For I shall return to the All mighty tree-
And re-live the cycle again.
A tree is karma churning-
We keep coming time and again.
But I guess, you'd never know,
Because, we leaves are one too many
We sprout with joyous glory
In every heart, nook and cranny.

Alas! No more!
Heat, disease and drought has left us in the breeze-
Contemplating the end
Awaiting our release.
The earth below has hardened-
I yearn its soft embrace;
If I had any tears
I would share with Her Grace.

I hang from a bough, like the farmer two moons ago;
The winds whisper, of all he had to give-
First his crops, then his cattle,
And finally his will to live.
His eyes had stared-
Unblinking, at the skies
Imploring a drop of living water-
Beseeching merciful lives!
They lowered his body hurriedly-
Come next morning.
It was there for all to see,
Yet none heeded the warning!
They said it was a bad omen
For it to be seen-
The new construction's owners
Would not have been too keen;

Man, tree, bird- all side-lined
By machines that roll up night and day,
Perhaps they will download us later
Or order us on e-bay.
The evening they'd cut a lovely red ribbon-
The colour of a coppersmith barbet's throat;
Great times were coming-
Or so, they must have thought.
Amidst the dust and heat-
As they consumed cake and tea,
I knew we would be replaced next-
By a pretty plastic tree.

GRIHA's International Presence

At the IBPSA World Building Simulation Conference 2025 (BS2025) in Brisbane, Australia, a joint research paper titled 'Validation of CIE Sky Models Using Luminance Data from Gurugram and Chennai, India', authored by TERI, GRIHA Council, and Saint-Gobain Research India, was presented

GRIHA Council team during their visit to the Queensland University of Technology (QUT), Australia

GRIHA Council team during their visit to the School of Architecture, Design and Planning, University of Queensland, Australia

Seventh Meeting of the International Solar Alliance (ISA) Regional Committee for the Africa Region

a. GRIHA Council team at the Seventh Meeting of the International Solar Alliance (ISA) Regional Committee for the Africa Region, held during September 2–4, 2025 in Accra, Ghana

b. Mr Sanjay Seth, Vice President and CEO, GRIHA Council and Senior Director, Sustainable Infrastructure Programme, TERI during the session titled 'CEO Caucus: equipping the African private sector for leadership in the region's energy transition' at the Seventh Meeting of the International Solar Alliance (ISA) Regional Committee for the Africa Region

GRIHA Council team with Ms Ariesta Ningrum, Secretary to the CTCN Advisory Board and Director, CTCN and UNEP at the 26th Advisory Board Meeting of the United Nations Climate Technology Centre and Network (CTCN), currently underway, held from 12–17 September in Bonn, Germany

Unlocking the Potential of District Cooling in Urban India

District cooling forms the subject matter of the present article penned by **Siddharth Jain.** District cooling has immense potential to support India's sustainable development and net-zero goals, offering significant energy savings, lower emissions, and better urban infrastructure. However, large-scale adoption will require long-term planning, strong policy support, and strategic financial investments. With the right regulatory push, district cooling could become a mainstream cooling solution, shaping the future of India's urban sustainability landscape.

Siddharth Jain

as a design consultant, has an extensive experience of 11 years working in the sustainable design. Demand-side management, energy efficiency, and programme management are his core areas of expertise.

India is among the world's fastest-growing economies, with a population exceeding 1.4 billion and a landmass of 3.287 million square kilometres. The country's rapid urbanization and increasing energy demand, particularly in the building sector, underscore the urgent need for energy-efficient solutions to meet Nationally Determined Contributions (NDCs) and Sustainable Development Goals (SDGs).

Currently, 40% of India's electricity consumption comes from the building sector, which is expanding at a compound annual growth rate (CAGR) of ~6%. Furthermore, nearly two-thirds of the buildings projected for 2030 are yet to be constructed, with India's urban population expected to reach 814 million by 2050. This scenario presents a significant opportunity to enhance urban living conditions while simultaneously reducing future energy demand through the adoption of energy-efficient and thermally optimized buildings.

Growing Need for District Cooling in India

Cooling demand in India's commercial building sector is estimated to reach 110 million tonnes of refrigeration (TR) by 2037–38. A study by Energy Efficiency Services Limited (EESL) suggests that district cooling systems (DCSs) could theoretically cater to 51 million TR of this demand, potentially:

- Reducing electricity demand by up to 22 GW
- Lowering CO_2 emissions by 27 million tonnes annually

However, for such large-scale adoption to be feasible, robust policy frameworks and regulatory mechanisms are necessary. The study presents a more realistic scenario of 13 million TR capacity by 2038, which would still require significant policy intervention.

India's Policy Push for Sustainable Cooling

In 2019, India became one of the first countries to introduce a comprehensive cooling strategy through the India Cooling Action Plan (ICAP). The ICAP provides a 20-year road map to address cooling requirements across sectors and aims to:

- Reduce cooling demand by 20–25% by 2037–38
- Cut refrigerant consumption by 25–30%
- Lower cooling energy consumption by 25–40%
- Promote research and innovation in cooling technologies
- Train and certify 100,000 technicians under the Skill India Mission

These objectives align with the need for sustainable cooling solutions like district cooling, which can help optimize cooling-related energy consumption and contribute to India's net-zero commitments.

The Potential of District Cooling Systems in India

DCS can play a transformative role in India's climate action and energy transition strategies, offering:

- Energy savings of 7,850 gigawatt hour (GWh) annually
- Reduction of 6.6 million tonnes of CO_2 emissions per year
- Integration with renewable energy sources and low-global warming potential (GWP) refrigerants
- Peak load management, reducing the need for additional power generation capacity

Recognizing these benefits, policymakers in India are increasingly exploring the role of district cooling in sustainable urban planning.

Figure 1 *District cooling system*

Government Support and Urban Development Initiatives

The Indian government has prioritized urban transformation strategies in the 2024–25 Union Budget focusing on:

- Transit-oriented Development in 14 major cities
- Smart Cities Mission (SCM) for urban rejuvenation
- Atal Mission for Rejuvenation and Urban Transformation (AMRUT) for sustainable infrastructure

DCS could become a key enabler in achieving these urban sustainability goals by providing efficient cooling solutions for large mixed-use developments, commercial hubs, and public infrastructure.

Impacts of Cooling-focused Programmes for District Cooling System in India

Cooling-focused programmes funded by GIZ and UNEP have significantly contributed to advancing DCSs in India by supporting policy development, technical studies, and institutional capacity building. These programmes played a key role in shaping the India Cooling Action Plan (ICAP) which recognizes DCS as a sustainable solution to meet the rising urban cooling demand. By conducting feasibility studies in cities like Amaravati and Rajkot, and providing toolkits and technical assistance, they helped urban local bodies and Smart Cities evaluate and plan for DCS implementation. Furthermore, they facilitated stakeholder engagement, promoted public–private partnerships, and built awareness on the environmental and economic benefits of DCS such as reducing peak electricity demand, integrating low-GWP refrigerants, and cutting CO_2 emissions. These initiatives have helped create an enabling environment for India to scale-up district cooling as part of its broader energy efficiency and net-zero strategy.

Existing District Cooling Projects in India

Several large-scale projects in India have already implemented DCSs including:

- GIFT City, Ahmedabad – India's first merchant DCSs
- Delhi Airport – 20,000 TR capacity
- Mumbai Airport – 20,000 TR capacity
- Chennai Airport – 12,000 TR capacity
- Infosys Campuses – ~50,000 TR across various locations
- Pragati Maidan, Delhi – 12,000 TR (under construction)
- India International Convention Centre, Delhi – 10,000 TR (under construction)
- Hyderabad Pharma City (HPC) – Proposed DCS integration

These projects highlight the growing adoption of DCS in India, particularly in commercial, institutional, and mixed-use developments.

The Road Ahead for District Cooling in India

For district cooling to be widely adopted, India must:

- Implement clear regulatory frameworks and financial incentives (for example, tax benefits, viability gap funding)
- Mandate DCS in large mixed-use campuses with compliance to ECBC and green building certifications
- Drive awareness and capacity building, similar to the success of piped natural gas (PNG) infrastructure

Conclusion: is district cooling realistic for India?

District cooling has immense potential to support India's sustainable development and net-zero goals, offering significant energy savings, lower emissions, and better urban infrastructure. However, large-scale adoption will require long-term planning, strong policy support, and strategic financial investments. With the right regulatory push, district cooling could become a mainstream cooling solution, shaping the future of India's urban sustainability landscape.

Blueprints for Tomorrow

Ar. Kiranjeet Kaur Jassal
Environmental Architect and Researcher

In a world that's fast and always loud,
We build our cities strong and proud.
But beneath the shine, behind the glass,
Lies a question we all must ask.
Are we building to last and care,
Or just shaping steel and air?
Are we designing with the earth in mind,
Or leaving our balance far behind?

The time has come, the signs are clear,
The planet whispers, "Act, my dear."
Not with fear, but hands so bright,
With innovations shaped by light.

Let's build with mud, not just cement,
Let our rooftops pay the rent.
With gardens, water, and solar rays,
Let homes be smart in brand new ways.

The time has come, the signs are clear,
The planet whispers, "Act, my dear."
Not with fear, but hands so bright,
With innovations shaped by light.
Let's build with mud, not just cement,
Let our rooftops pay the rent.
With gardens, water, and solar rays,
Let homes be smart in brand new ways.
The breeze can cool, the trees can shade,
Let carbon bills be never paid.
From local stone to second-hand wood,
We can turn "old" into good.

Catch the rain, reuse the flow,
Let no precious drop just go.
Greywater gardens, zero waste,

A cleaner world built with taste.
Why waste a wall on concrete heat,
When cob or lime can feel so sweet?
Let children breathe clean indoor air,
In classrooms made with mindful care.

Innovation isn't just high-tech,
It's smart design with zero wreck.
A courtyard breeze, a shaded lane,
A system that reuses grain.
Think of windows facing right,
Think of streets that share the light.
Solar lights and natural breeze,
Let's build with balance, grace, and ease.

Learn from the past, build for the next,
Use less jargon, be more flexed.
From bamboo frames to cooling earth,
Each idea adds to nature's worth.
Cities green, with paths to walk,
Where silence speaks more than talk.
No traffic jam, just bike and foot,
With urban farms to share the fruit.
A GRIHA home, a future plan,
Where eco-living truly began.
Scoring stars not just in pride,
But for the rivers, trees, and tide.

Together we draw this new design,
With every line, a greener sign.
For every child, for every sparrow,
We sketch the blueprints for tomorrow.

MoUs and Collaborations
2024-25

With Kendriya Vidyalaya Sangathan, Ministry of Education, Government of India during the 16th GRIHA Summit

With Indian Institute of Architects (IIA), Punjab Chapter during the GRIHA Regional Conclave in Chandigarh on 17 February 2025

With NICMAR University during the GRIHA Regional Conclave in Chandigarh on 17 February 2025

With the Indian Institute of Architects (IIA), Assam Chapter during the GRIHA Regional Conclave in Guwahati on 10 March 2025

With Association of Architects, Assam (AAA) during the GRIHA Regional Conclave in Guwahati on 10 March 2025

With Siksha 'O' Anusandhan, University in Bhubaneswar during the GRIHA Regional Conclave in Bhubaneswar on 25 March 2025

With Chitkara University, Punjab on 20 May 2025

With Fluxgen Technologies during the GRIHA Regional Conclave in Bengaluru on 20 June 2025

With Rajiv Gandhi Proudyogiki Vishwavidyalaya (RGPV), Bhopal during the GRIHA Regional Conclave in Bhopal on 12 September 2025

With Ar. Rahul Shrikhande for publication of his book 'Redesigning the Future' during the GRIHA Regional Conclave in Bhopal on 12 September 2025

Long before international rating systems recognized the need to focus on decarbonization of the buildings and construction sector, the GRIHA Rating Systems had adopted a carbon emissions approach alongside post construction and occupation - performance metrics to validate what was intended in design. This stewardship is evident in the GRIHA-certified buildings, fundamental to a sustainable environment.

Sushma Patankar, Director, C R Narayana Rao (Consultants) Private Limited

With surge in construction activities and the associated environmental impacts, frameworks like GRIHA are instrumental in guiding the design of buildings which are energy efficient, climate resilient, and foster healthier environments. We remain committed to creating spaces that embody these principles, as they represent the most practical and responsible path forward.

Ragini Goswami, Principal, ECOSPACE-Green Design Consultancy, Guwahati

To me, GRIHA is like a checklist for building better. It helps us think about nature, saving water and energy, and take the right sustainable measures, step by step. It makes going green feel doable, not overwhelming.

Ar. Jigna Vanjara, Green Building Consultant, Eneed Integrated Services Private Limited

The GRIHA Council is a renowned organization in India that promotes sustainable building practices and green architecture. Collaborating with GRIHA provides access to expertise in sustainable building practices, green architecture, and environmental sustainability. GRIHA certification is a recognized standard for green buildings in India, enhancing the credibility and reputation of projects.

N K Ojha, Green Building Consultant, Geo Designs and Research Private Limited

Collaborating with GRIHA Council has been an inspiring journey. Their framework and visionary approach have guided us in creating environmentally responsible spaces that go beyond compliance and truly embody sustainability. We value this impactful partnership deeply.

Anurag Bajpai, Director, GreenTree Global

Pioneering sustainable architecture, fostering eco-friendly habitats, and redefining India's built environment with innovative green building practices, reducing environmental footprint, and promoting a healthier planet for future generations through green rating and certification.

Dipika Tuteja, Founder, In AWE

Collaborating with GRIHA Council has been transformative. Their holistic rating parameters ensure sustainability across all project phases—design, construction, and post-occupancy—focusing on resource efficiency, circularity, and continuous performance improvement. Truly impactful and innovative.

Ar. Gouri Rathod, Proprietor, Green Building Expert, Saga and Associates

Working with GRIHA for over 15 years and 50+ projects has been transformative—its Indianized, practical approach makes sustainability real, implementable, and drives India's built environment toward a truly net-zero future.

Gaurang Lele, Director, SHASHWAT Green Building Consultants

Collaborating with GRIHA Council has been pivotal in advancing sustainable building practices. Their comprehensive frameworks and commitment to climate resilience have significantly influenced our approach to creating environmentally responsible habitats.

Dr Priyanka Kochhar, Chief Executive Officer, The Habitat Emprise

Every GRIHA project is a step towards purposeful design. It's not just a rating—it's a partnership that fuels UEDC's passion to craft sustainable, future-ready spaces that inspire, endure, and redefine environmental responsibility in the built world.

Vevaik Mahajan, Director, UEDC

Unquote

Kathak Threads

Innovating carbon-negative furniture for a climate-resilient future

This article composed by **Vaishaly** has been woven around the 'carbon-negative furniture'. Agricultural waste has the potential of being transformed into solid wood-like premium furniture. The author informs us how in an era where climate resilience is no longer optional, Kathak Threads, offers a tangible response, one that marries cultural continuity with environmental accountability. It shows that luxury can be circular, that heritage can drive innovation, and that every design decision can become an act of climate consciousness.

As we accelerate towards a climate tipping point, the role of design must evolve from aesthetic storytelling to environmental responsibility. Kathak Threads, India's first carbon-negative furniture collection, steps firmly into this future rethinking what sustainable luxury looks and performs like. Born out of a collaboration between Doodle Studio and Studio Macrocosm, the collection embodies a fusion of artistic heritage, material innovation, and carbon-conscious action, offering a new benchmark for climate-resilient interior design.

Vaishaly

is the Founder and Principal Architect of Doodle Studio and Studio Macrocosm. An architect and sustainability consultant, she focuses on bridging the gap between sustainability consulting and interior fit-outs. Her work emphasizes high-performance buildings, energy efficiency, and regenerative materials.

Reinventing Resources: palm strand board as a climate material

At the heart of Kathak Threads lies a material innovation that transforms waste into worth Palm Strand Board (PSB). Unlike traditional wood or engineered panels like medium-density fibreboard (MDF) or plywood, PSB is made by repurposing palm leaves and fronds; a typically discarded agricultural biomass found in arid and semi-arid regions.

These palm strands are bonded using zero-formaldehyde, water-based resins, ensuring the final boards are volatile organic compounds (VOCs)-free, non-

toxic, and safe for both craftsmen and occupants. What makes PSB unique is that it requires no tree to be cut, yet delivers strength, density, and durability equivalent to wood, making it a viable structural alternative for luxury furniture.

Beyond material performance, the environmental benefits of PSB are substantial. By diverting palm waste from landfills or open burning both common practices in the region, it helps avoid the release of significant carbon emissions. This makes PSB not only a sustainable option but a regenerative one, contributing to India's shift towards circular economies.

Crafted with Consciousness

The execution of each product reflects the same sensitivity as its design intent:

- Water-based, zero-formaldehyde polishes ensure healthier indoor air
- 100% recycled or organic upholstery fabrics eliminate the need for virgin textile inputs

Image 2 *Palm strand board, a sustainable material*

Image 1 *Carbon-negative furniture*

- Traditional joinery techniques, perfected by master craftsman, minimize the use of adhesives and hardware, further reducing embodied energy and supporting end-of-life disassembly

These choices, while artisanal, are also strategic supporting low-carbon assemblies recommended under Green Rating for Integrated Habitat Assessment (GRIHA) and other rating frameworks.

From Calculation to Contribution: understanding carbon negativity

What makes Kathak Threads truly innovative is its scientifically-backed carbon footprint assessment. Every chair in the series is evaluated using a cradle-to-gate approach, which considers every stage from material sourcing to delivery.

The furniture line supports key UN Sustainable Development Goals (SDGs):

Here's a breakdown of average emissions per chair:

- Raw material (PSB): nearly -13.52 $kgCO_2e$ (calculated using the material's EPD and transport data)
- Manufacturing process: nearly +0.22 $kgCO_2e$
- Surface treatment (polishes and finishes): nearly +9.0 $kgCO_2e$
- Packaging and transport: nearly +3.06 $kgCO_2e$
- Net carbon footprint after manufacturing and logistics: nearly -0.07 $kgCO_2e$ per chair
- Exclusive emissions before dispatch: nearly -4.30 $kgCO_2e$ per chair

In essence, each chair not only does less harm, it does more good. It removes more CO_2 than it emits, positioning it well beyond carbon neutrality. For context, a standard wooden chair contributes around +22.69 $kgCO_2e$ in emissions. Meanwhile, each Kathak Threads chair offers a climate benefit equivalent to the carbon absorption of nearly 0.2 mature trees annually a compelling figure in the context of India's net-zero ambitions.

A Design Language Rooted in Cultural Heritage

While the material and environmental strategy form the foundation of Kathak Threads, its visual identity is inspired by Indian classical dance particularly Kathak.

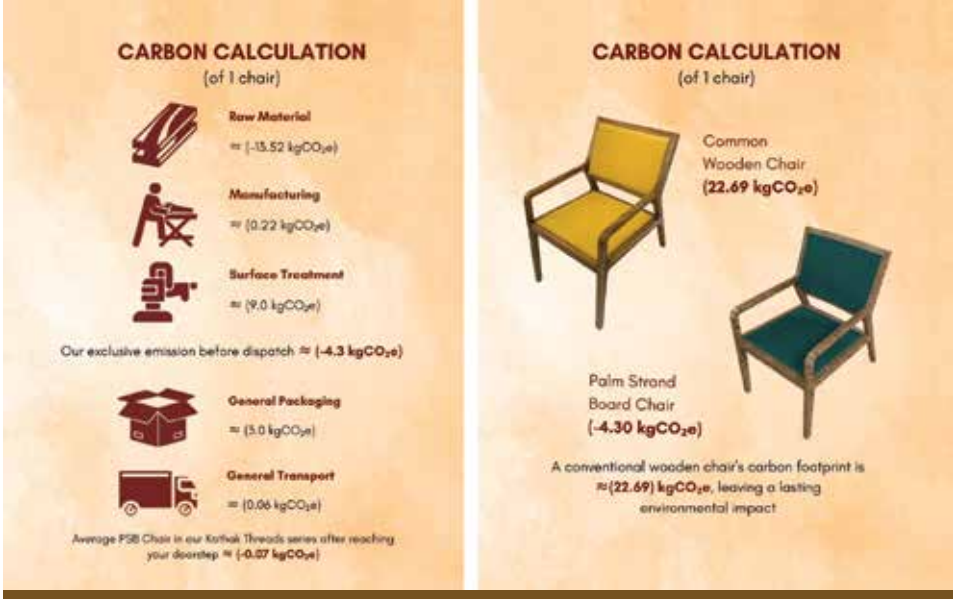

Figure 1 *(a) Carbon calculation and (b) comparison—a conventional wooden chair and a chair manufactured at Kathak Treads*

The grace of mudras, the precision of stance, and the subtle rhythm of movement all come alive through curves, joints, and proportions. Each accent piece is intentionally designed with the balance and poise of a dancer, upright yet fluid, still yet expressive. The storytelling continues, not through movement, but through material, form, and function.

Scalable Sustainability: more than just a collection

While Kathak Threads began as a curated series of furniture pieces, the methodology behind it is replicable across typologies. This carbon-negative framework can be adapted for wardrobes, tables, workstations, and full interior fit-outs making it highly relevant for projects aiming for net-zero interiors.

Designed for luxury residences, green-certified hotels, and conscious workspaces, the collection aligns seamlessly with the ESG goals of India's fast-growing real estate and hospitality sectors.

Redefining the Future of Furniture

In an era where climate resilience is no longer optional, Kathak Threads offers a tangible response, one that marries cultural continuity with environmental accountability. It shows that luxury can be circular, that heritage can drive innovation, and that every design decision can become an act of climate consciousness.

By transforming agricultural waste into solid wood-like premium furniture, and proving that no trees need to be cut to create beauty with structure, the collection sets the stage for a new paradigm in design, one where materials heal, stories inspire, and furniture contributes to a climate-positive future.

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Inaugural Address by Shri Manu Srivastava (IAS), Additional Chief Secretary, Madhya Pradesh Urja Vikas Nigam, Government of Madhya Pradesh

Keynote Address by Shri Lalit Krishan Singh Dehiya, Pr. CCIT, MP and CG and Income Tax Department

GRIHA Updates and Vote of Thanks by Smt. Shabnam Bassi, Deputy CEO and Secretary, GRIHA Council and Director, Sustainable Buildings Division, The Energy and Resources Institute (TERI)

Signing of MoU between GRIHA Council and Rajiv Gandhi Proudyogiki Vishwavidyalaya (RGPV), Bhopal to advance and accelerate sustainable practices in the built environment and work in collaboration to create sustainable infrastructure through awareness and capacity-building programmes

Dr Surendra Bajpai, retired Chief Engineer, Madhya Pradesh Urja Vikas Nigam, Government of MP; Shri Vipin Goel, Joint Secretary, CREDAI-National; Director, CREDAI Bhopal and Partner- Raksha Builders and Padmanabh Developers; Shri Sanjay Seth, Vice President and Chief Executive Officer, GRIHA Council and Senior Director, Sustainable Infrastructure Programme, TERI; Dr Sheetal Sharma, Dean and Professor, School of Architecture, VIT Bhopal; Shri Jai Nagda, Director, Vidhyakunj International School and Journalist; Shri Rajesh Nagal, Former Director, State Institute for Town Planning, Bhopal, and Former Joint Director, Town and Country Planning, Indore; Dr Vinay Prakash Shrivastava, Partner, Vastu Vista and Shri Jitendra Rathore, Assisstant Engineer, Bhopal Smart City (from L to R) during the session 'Climate Smart City: urban transformation for sustainable Bhopal'

From Despair to Repair: A sustainable future

Tejas Agarwal
Student, Amity International School, Vasundhara

A great symphony of nature,
The beautiful harmony between creatures.
Has begun to vanish in a quick haste
The destruction of earth at a rapid pace.

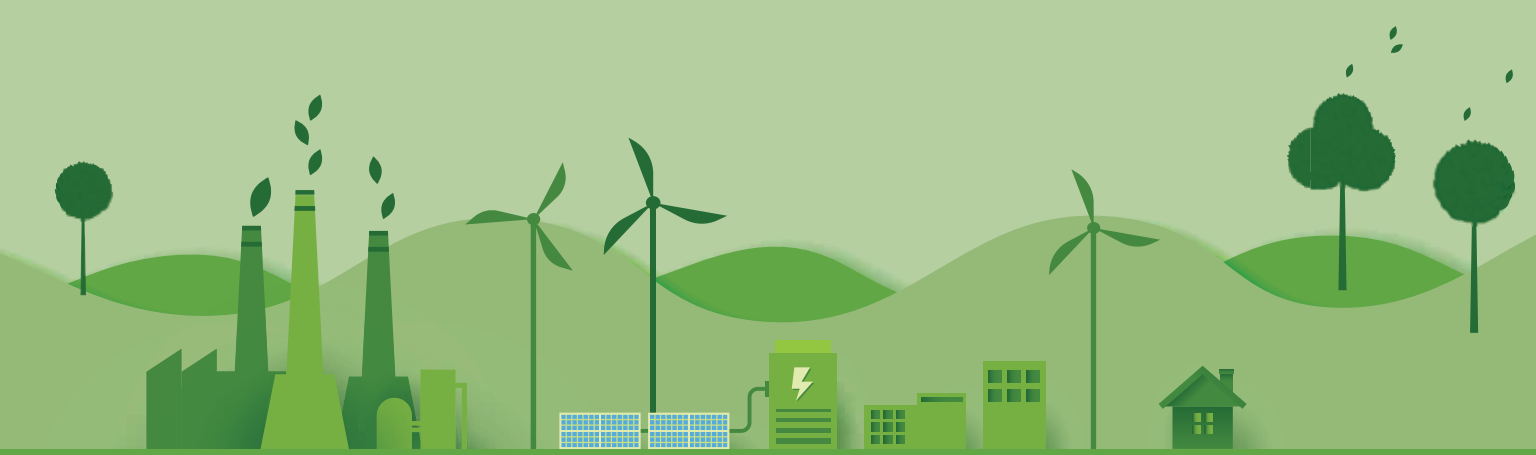
The skies once clear now wear a haze,
The forests whisper in smoky daze.
The oceans rise, the rivers cry,
The planet pleads; don't let it die.

But hope is born where minds unite,
With hands that build and hearts that fight.
To innovate is now our call,
To rise before the systems fall.

Let's shape new paths with cleaner ways,
With solar light and wind-blown days.
Recycle, reuse, upcycle the plastics,
To make a change which is truly drastic.

From farming smartly and resiliently,
To making sustainable cities brilliantly.
Each action plan, though small it seems,
Can spark the change from dreams to green.

Let nations join and youth arise,
With clearer goals and brighter skies.
An amazing world is ours to make,
Let's act for Earth, for all our sake.



Nature Knows Best

Rethinking urban futures through the lens of neo-determinism

In this article, **Dr Asit Kumar Roy,** makes us aware about the relevance of neo-determinism. Or rather reminds us of this term. The author pinpoints how river rejuvenation, nature-based solutions, and climate-resilient master plans are widely discussed in policy circles and think tanks, the physical city remains vulnerable, choked by moderate yet poorly managed localized storm events. He strongly advises the paradigm of urban development must shift from symbolic modernity to substantive resilience.

Dr Asit Kumar Roy

is engaged as Research Associate with The Energy and Resources Institute (TERI), New Delhi, India.

The history of human civilization and the utilization of earth resources has remained a catalyst for debate between competing geographical paradigms, determinism, possibilism, and the more pacifying view of neo-determinism. Determinism argues that nature sets perpetual boundaries within which human societies evolve, offering limited scope for modifications (Semple 1911). Possibilism, conversely claims that willingness to explore, technological drive, and cultural manifestations enabling transformation of natural landscapes and make it suitable for refined socio-cultural advancements (Sauer 1925). Yet, neo-determinism introduces a more balanced standpoint, while the environment provides the foundational setting, it is eventually human decision, institutional aptitude, and adaptive capacities that determine the sustainability of any intervention (Taylor 1936). In the epoch of Anthropocene, here anthropogenic activities are the major drivers of planetary change, neo-determinism offers a persuasive lens to understand and guide the desirable urban development.

This elementary context feels especially relevant in the wake of a thunderstorm that hit the Delhi National Capital Region (NCR), including parts of Haryana, during the early hours of 2 May 2025. With wind speeds above 70 km/h and rainfall nearly 77 mm, exceeding the carrying capacity of the master drainage system in the NCR, the event called into question the infrastructural

Image 1 *Dr Bhim Rao Ambedkar Marg in Gurugram was inundated following a severe thunderstorm on 2 May 2025, leaving vehicles struggling through stagnant water. This instance of sudden urban flooding highlights the limited carrying capacity of the drainage infrastructure during the extreme weather events and underscores the urgent need for resilient stormwater management and sustainable urban planning in an increasingly volatile climate regime*

efficiency and exposed systemic urban vulnerabilities (IMD 2025a; IMD 2025b). Waterlogging immobilized arterial roads, vehicles were stranded, and road-side trees, planted for urban greening, were uprooted. Despite the growing frequency of such events under changing climatic regimes, the commons, administrative institutions, and physical infrastructure were all caught unprepared (IPCC 2022). This is where the earlier academic debates find urgent application. Among the urban agglomerations within NCR, Gurugram was particularly affected, grappling with the repeated menace of thunderstorm events throughout May 2025. In this context, it is important to recognize that the growth of Gurugram has occurred upon a geomorphologically sensitive region marked by Quaternary alluvium and underlying Proterozoic quartzite ridges, as an extended part of the ancient Aravalli range (CGWB 2021). These features inherently restrict groundwater recharge and natural stormwater dispersion, rendering the area prone to flash flood effects if high-intensity rainfall strikes. This city also lies within a tropical steppe climate having a modest monsoonal influence, making it climatically semi-arid and ecologically fragile (Koppen 1936). Yet, in a pattern seen across the many other Indian cities (such as Chennai, Bengaluru, Mumbai), urban planning has proceeded without adequate acknowledgement of these physical realities (Bharath, *et al.* 2018). Likewise, the storms experienced on 2 May, and subsequently on the 15, 17, 21, and 25 of 2025 across the NCR, including Gurugram, are nothing but direct manifestations of the incompetence to address the determinism embedded within the spatial characteristics of the region.

The development narrative of Gurugram reflects a form of cosmetic urbanism, marked by glass-clad towers, symmetrical boulevards, and gated enclaves, yet fails to accommodate adaptive infrastructure, ecologically informed material choices, and resilient drainage systems. Such misalignment between natural landscape and landscaping is not unique to Gurugram but signifies a broader urban crisis in India,

where the drive for modernity often ignores the basics of geo-ecological fundamentals (Revi, Satterthwaite, Aragón-Durand, *et al.* 2014). While national policies emphasize 'sponge city' concept and 'climate-smart infrastructure', their implementation remains insignificant unless grounded in hydrological logic and terrain-responsive design (OECD, World Bank, UN Environment 2018).

Neo-determinism provides a critical explanatory bridge between natural constraints and societal choices. It acknowledges the role of climate, geomorphology, and geology in offering the developmental potentials, while recognizing that these are not destiny. Rather, they serve as parameters within which human inventiveness must operate responsibly. The recurrent storm events eventually demonstrate the pure determinism, that we are helpless against nature and unchecked possibilism, that we can conquer nature entirely are both inappropriate how far the question of our adaptive survival. Instead, neo-determinism calls for an ecologically informed agency, one that neither ignores environmental limits nor assumes infinite adaptability. Here, the irony lies in the fact that, while river rejuvenation, nature-based solutions, and climate-resilient master plans are widely discussed in policy circles and think tanks, the physical city remains vulnerable, choked by moderate yet poorly managed localized storm events. Urgently, the paradigm of urban development must shift from symbolic modernity to substantive resilience. In due course, these such calamitous events serve as stark reminders that the land beneath us continues to follow the laws of nature, even when planners overlook to acknowledge them.

References

Central Ground Water Board (CGWB). 2021. *Ground Water Yearbook – Haryana 2020–21.* North Western Region, Chandigarh: Ministry of Water Resources, River Development and Ganga Rejuvenation, Government of India

India Meteorological Department (IMD). 2025a. Rainfall and Thunderstorm Report: NCR–Haryana Region, 2 May 2025. Press release. IMD, New Delhi

India Meteorological Department (IMD). 2025b. *Monthly Weather Report of Delhi: May 2025.* Regional Meteorological Centre, New Delhi

Intergovernmental Panel on Climate Change (IPCC). 2022. *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the IPCC.* Hans Otto Pörtner, Debra C Roberts, *et al* (eds). Cambridge: Cambridge University Press

Wladimir, K. 1936. Das geographische System der Klimate. In: *Handbuch der Klimatologie*, Teil C, 98–167. Berlin: Gebrüder Borntraeger

Organization for Economic Cooperation and Development (OECD), World Bank, and UN Environment. 2018. Financing Climate Futures: *Rethinking Infrastructure.* Paris: OECD Publishing

Revi, A, D E Satterthwaite, F Aragón-Durand, J Corfee-Morlot, R B Kiunsi, M Pelling, D C Roberts, and W Solecki. 2014. Urban areas. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects*, C. B. Field, *et al.* (eds), pp. 535–612. Cambridge: Cambridge University Press

Sauer, C O. 1925. The morphology of landscape. *University of California Publications in Geography* **2** (2): 19–54

Semple, E Churchill. 1911. *Influences of Geographic Environment: On the Basis of Ratzel's System of Anthropo Geography.* London: Constable

Taylor, G. 1936. *Environment and Nation: Geographical Factors in the Cultural and Political History of Europe.* Toronto: University of Toronto Press

Aithal, B, H, M C Chandan, V Shivamurthy, and T V Ramachandra. 2018. Modelling urban dynamics in rapidly urbanizing Indian Cities. *The Egyptian Journal of Remote Sensing and Space Science* **21** (3): 201–210. DOI: https://doi.org/10.1016/j.ejrs.2017.06.002

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