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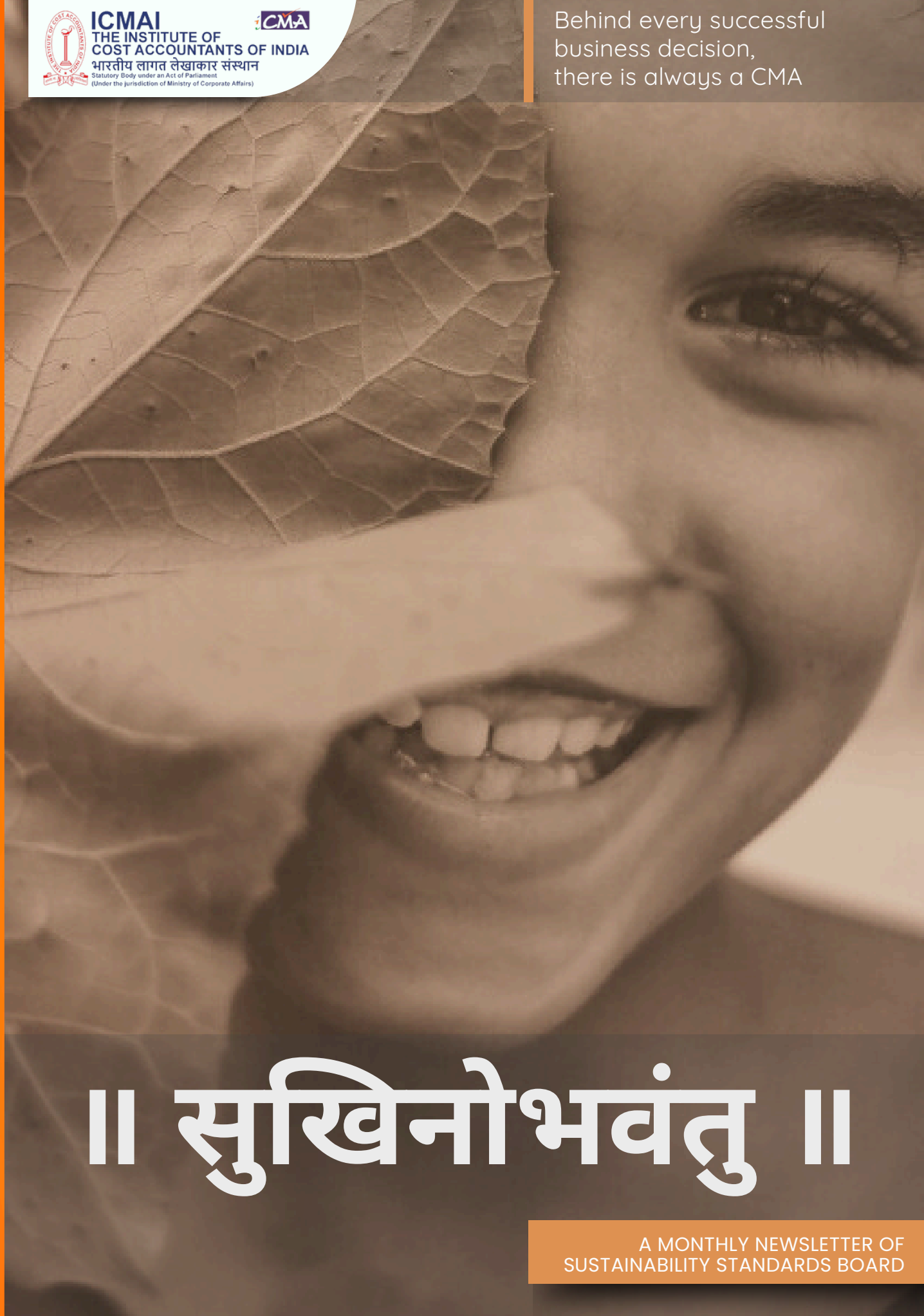

# ॥ सुखिनोभवंतु ॥

A MONTHLY NEWSLETTER OF
SUSTAINABILITY STANDARDS BOARD

www.icmai.in

**Volume XXVIII**
November, 2025

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# Message

## from the Chairman

As we step into November 2025, I am pleased to welcome you to this month's edition of *Sukhino Bhavantu*. November inspires us to pause, reflect, and renew our shared commitment to sustainability, responsibility, and collective well-being.

This month holds special meaning for the Institute as 14th November marks Children's Day, closely aligned with SDG 3 (Good Health and Well-being). The health, safety, and holistic development of our children remain at the heart of building a sustainable future. Let us take this opportunity to reaffirm our duty to create nurturing, safe, and equitable environments for every child.

November also brings important global reminders. The International Day for Preventing the Exploitation of the Environment in War and Armed Conflict (6th November) urges the world to safeguard nature even in times of crisis. UNEP's Adaptation Gap Report (7th November) highlights the critical acceleration needed in global climate resilience. America Recycles Day (15th November) reinforces the significance of responsible consumption and recycling in strengthening the circular economy. These observances collectively remind us that sustainability begins with conscious choices and coordinated action.

The Board is also preparing for Sustainability Month – January 2026, our flagship initiative promoting awareness, capacity-building, and stakeholder engagement across ESG and sustainability domains. A comprehensive roadmap has been charted, featuring knowledge sessions, outreach activities, and key publications.

I am pleased to inform you that *Sukhino Bhavantu*, has been revamped and will now be presented in a novel, improved and refreshing format. Your ideas and guidance are crucial to enriching our initiatives. I also sincerely compliment the dedicated efforts taken by CMA (Dr.) Aditi Dasgupta, Joint Director, for the consistent efforts in enhancing the quality of the newsletter month after month and taking its standards to greater heights.

With *Sukhino Bhavantu* coming in a revamped form and more enriched content in the pipeline, your feedback and suggestions are sincerely solicited. As we continue striving for excellence, we seek your valuable views on further improving the newsletter, as well as your suggestions for activities to be undertaken during the ensuing Sustainability Month, to be celebrated in January 2026. Do mail us at *ssb.newsletters@icmai.in*

As we continue striving for excellence, we seek your valued views on further improving the newsletter, as well as your suggestions for activities to be undertaken during the Ensuing Sustainability Month, to be celebrated in January 2026.

**Professionally Yours,**
**CMA (Dr.) Ashish P. Thatte**
**Chairman, Sustainability Standards Board, ICMAI**
**November 25, 2025**


## Mrityunjaya

*— The Woman Who Was Never Born, Never Died*

## Her 114 years

There are lives that begin with the first breath and end with the last. And then there are lives that begin as a whisper of purpose, ripen into green corridors, and refuse to end. Saalumarada Thimmakka belongs to the latter — a woman who transformed her quiet life into a living epic of resilience. A woman who, through sheer compassion, became Mrityunjaya: one who conquers death through legacy.

Born into poverty, unlettered, and burdened with the silence of childlessness, Thimmakka could easily have remained invisible. Instead, she chose creation. What life denied her in the form of children, she reclaimed in the form of saplings — planting and nurturing 385 banyan trees along the dusty road from Hulikal to Kudur. For decades, she and her husband walked miles to water them, carrying pots of hope and returning with a mother's quiet satisfaction.

In that choice, she was born — not as a woman of circumstance,
but as a force of nature and through those banyans, she refuses to die.

Her lifework earned her one of India's highest civilian honours — the Padma Shri. Yet even this recognition is only a shadow of the deeper truth: Thimmakka's real award is the forest she created, the shade she gifted to strangers she would never meet.
Her vision now extends far beyond that single stretch of road. In North Bengaluru, a 153-acre Salumarada Thimakka Botanical Garden is set to rise — a living tribute to her devotion, a sanctuary of biodiversity, and a national symbol of how one individual can seed an ecological movement.

Her legacy has also been tested.

In 2019, a proposal to widen the Begapalli–Hallaguru road threatened the very trees she had nurtured like children. When the news reached her, Thimmakka — then already past a hundred — appealed directly to the Chief Minister and Deputy Chief Minister. Her plea was simple, powerful, and impossible to ignore. The government responded with respect befitting her stature, promising that the trees would be protected and redesigning the project so her forest remained untouched.

Through all this, Thimmakka has shown that a visionary is not one who merely imagines the future, but one who plants it — literally. Her banyans have become milestones of hope, their roots gripping the soil as firmly as her values grip India's conscience.

Generations from now, long after our own names have dissolved into silence, travellers will walk beneath the shade she planted. They may never know her face, her struggles, or her story — but they will walk inside her legacy.

Such a person is never truly born. Such a person never dies.

Saalumarada Thimmakka lives on — in every leaf that trembles in her forest, in every young hand that plants a sapling, in every policy that protects life.
And in this spirit, the Sustainability Standards Board of The Institute of Cost Accountants of India salutes her — not just as an environmental icon, but as India's evergreen Mrityunjaya, the visionary who became a forest.

# Continent-wise Corporate Sustainability Reporting Frameworks

## – Mapping of SDGs and Evaluation of Diversities

Article 4

## West Africa

**Emerging ESG Ecosystems and Regional SDG Alignment**

**CMA (Dr.) Aditi Dasgupta**
Joint Director
The Institute of Cost Accountants of India
Kolkata

**Abstract**

Africa is witnessing an evolving phase in corporate sustainability and ESG (Environmental, Social and Governance) reporting as part of its broader socio-economic transformation. Comprising sixteen nations, the region is increasingly aligning business practices with the United Nations Sustainable Development Goals (SDGs), particularly those addressing decent work, clean energy, climate action, and responsible consumption. This article examines the emerging sustainability frameworks in West Africa through the lens of regulatory reforms, sectoral SDG mapping, and national case studies from Nigeria, Ghana, Senegal, Côte d'Ivoire, and Burkina Faso. It highlights both the progress – such as the introduction of green bonds, national ESG disclosure guidelines, and climate investment platforms – and the challenges of limited data, institutional capacity, and high compliance costs. The analysis underscores the potential role of Indian Cost and Management Accountants (CMAs) in strengthening ESG assurance, policy design, and capacity building across the region. Ultimately, West Africa's sustainability journey reflects a transition from fragmented reporting to integrated resilience, marking its growing significance in the global sustainability landscape.

## A Region in Transition

West Africa is undergoing a quiet revolution in sustainability. With sixteen nations — including Nigeria, Ghana, Senegal, Côte d'Ivoire, Burkina Faso, and Benin — the region is navigating complex socio-economic landscapes while embracing the global call for responsible and transparent business practices.

Environmental, Social and Governance (ESG) principles and alignment with the UN Sustainable Development Goals (SDGs) are gradually becoming central to corporate and policy discourse. What once began as voluntary reporting is now evolving into an essential component of economic and governance reform.

## Key Takeaways

*West Africa's sustainability transition reflects a blend of innovation, cooperation, and purpose. With regional frameworks, growing investor confidence, and support from global and Indian professional communities, the region stands ready to transform sustainability reporting into a cornerstone of economic and social resilience.*

From Nigeria's green bonds to Ghana's SDG investor mapping, the region reflects a growing recognition that sustainable finance, ethical industry, and climate-conscious innovation are not just moral imperatives — they are drivers of long-term resilience.

## SDG Mapping Across Key Industries

West Africa's economic foundation spans agriculture, energy, mining, manufacturing, and finance. Each sector offers unique opportunities for integrating SDG-driven strategies into business and governance models.

Governments and investors are increasingly using such mappings to guide policy formulation, reporting mandates, and capital allocation, supported by platforms like the UNDP SDG Private Sector Mapping Initiative (sdgprivatefinance.undp.org).

| Industry | Relevant SDGs | Sustainability Focus |
|---|---|---|
| **Agriculture** | SDG 2 (Zero Hunger), SDG 12 (Responsible Consumption), SDG 13 (Climate Action) | Climate-smart farming, food security, agroforestry, sustainable land use |
| **Energy** | SDG 7 (Clean Energy), SDG 9 (Infrastructure), SDG 13 (Climate Action) | Off-grid solar, clean cooking, energy access, green grids |
| **Mining** | SDG 8 (Decent Work), SDG 12 (Consumption), SDG 15 (Life on Land) | SDG 9 (Innovation), SDG 8 (Economic Growth), SDG 11 (Sustainable Cities) |
| **Manufacturing** | SDG 9 (Innovation), SDG 8 (Economic Growth), SDG 11 (Sustainable Cities) | Circular economy, eco-design, industrial decarbonization |
| **Finance** | SDG 17 (Partnerships), SDG 10 (Reduced Inequalities), SDG 5 (Gender Equality) | Green bonds, inclusive finance, ESG investing, fintech for development |

## Country Case Studies

### Ghana: SDG Investor Mapping and Climate Action

Ghana's Environmental Protection Agency (EPA) promotes climate-related disclosures, and its SDG Investor Map identifies high-impact sectors — agriculture, clean energy, and education — under the UNDP SDG Impact Finance Initiative. Ghana is also piloting carbon market readiness under Article 6 of the Paris Agreement. [carbon-mechanisms.de]

### Nigeria: ESG Regulation and Green Finance

Nigeria's Securities and Exchange Commission (SEC) has introduced sustainability disclosure guidelines for listed entities, while the Nigerian Exchange Group (NGX) has issued ESG Reporting Guidelines (2022) aligned with the UN Sustainable Stock Exchanges Initiative. The country was also the first in Africa to issue a Sovereign Green Bond (2017), supporting renewable energy and afforestation. [UNDP, World Bank, NGX]

### Senegal: Water and SDG 6 Integration

Senegal is pioneering Earth Observation-based SDG mapping, focusing on water access and quality (SDG 6). Through the SERVIR-West Africa Program (ICRISAT), spatial data is being integrated into national sustainability planning. [servir.icrisat.org]

### Côte d'Ivoire: Cocoa to Carbon Transition

The country is transitioning from extractive dependence toward sustainability. ESG reforms focus on deforestation-free cocoa, a national green taxonomy, and sovereign green bond preparation, aligned with SDGs 8, 13, and 15. [isesg.org]

### Burkina Faso: ESG in SMEs and Regional Finance

Burkina Faso's SMEs are increasingly adopting ESG principles in agriculture and clean energy. The Bourse Régionale des Valeurs Mobilières (BRVM) — the regional stock exchange — launched its first sustainability bond, signalling a new phase of green finance in the WAEMU region. [fr.linkedin.com]

## The Regulatory and Reporting Landscape

Across ECOWAS and WAEMU, nations are embedding sustainability and transparency into corporate governance. The Financial Reporting Council (FRC) of Nigeria, Ghana SEC, and West African Development Bank (BOAD) have taken notable strides.

BOAD's 2023 Climate Strategy emphasizes alignment with the Paris Agreement and SDG 13 (Climate Action), while Ghana's Green Bond Market Development Strategy (2021) and Nigeria's Green Finance Initiative showcase concrete institutional progress.

Despite these advances, the UNEP Finance Initiative (2023) observes that while over 70% of West African listed companies recognize ESG relevance, fewer than 25% currently publish formal sustainability or integrated reports — reflecting early-stage reporting maturity.


## Challenges and Capacity Gaps

**Institutional Weaknesses**
Uneven enforcement of sustainability disclosure regulations across borders.

**Data Gaps**
Limited ESG and environmental data hinder comparability and investment confidence.

**Financial Barriers**
High reporting costs restrict participation by smaller firms.

**Sectoral Dependence**
Extractive industries dominate economies, complicating climate commitments.

These gaps underscore the need for capacity building, standardized frameworks, and South–South professional cooperation.

## Role of Indian CMAs: Strategic Enablers in West Africa

These initiatives mark a transition from fragmented reporting to structured sustainability governance.

**Capacity Building:** Training professionals in ESG accounting, SDG mapping, and integrated reporting.

**Framework Integration:** Developing hybrid ESG models combining GRI, IFRS S1/S2, and African Union Agenda 2063 standards.

**Policy Engagement:** Advising on ESG taxonomies, green budgeting, and impact-linked finance.

**Data Assurance:** Enhancing the reliability of sustainability disclosures for investors and regulators.

Through such partnerships, Indian CMAs can strengthen West Africa's institutional capabilities, ensuring that sustainability reporting becomes both credible and cost-effective.

## From Reporting to Regional Resilience

West Africa's ESG and SDG journey is rapidly gaining traction. With strategic partnerships, localized frameworks, and expanding investor participation, the region is poised to emerge as a sustainability leader of the Global South. Integrating ESG principles across industries and governance structures represents not merely a reporting shift — but a pathway to inclusive, resilient development.

## Opportunities for Growth

Momentum is rising across the region through:

- The emergence of green and social bonds;
- The adoption of IFRS S1/S2 Sustainability Disclosure Standards (2023);
- Greater alignment with UNDP, AfDB, and World Bank support for ESG integration; and
- Public–private collaborations such as Ghana's SDG Investment Platform and Senegal's Plan Sénégal Émergent.

These initiatives mark a transition from fragmented reporting to structured sustainability governance.

## References:

1. United Nations Development Programme (UNDP). (2023). Human Development Report 2023/24: Advancing Sustainable Development in a Fragmented World. New York: UNDP.
2. United Nations Economic Commission for Africa (UNECA). (2022). Africa Regional Forum on Sustainable Development: Accelerating the Implementation of the 2030 Agenda and Agenda 2063. Addis Ababa: UNECA.
3. World Bank. (2024). West Africa Economic Outlook: Navigating Climate and Sustainability Challenges. Washington, D.C.: World Bank Publications.
4. African Development Bank (AfDB). (2023). African Economic Outlook 2023: Mobilizing Private Sector Financing for Climate and Green Growth. Abidjan: AfDB.
5. Nigeria Stock Exchange (NGX). (2021). Sustainability Disclosure Guidelines for Listed Companies. Lagos: NGX Regulation Ltd.
6. Ghana Stock Exchange (GSE). (2022). Guidelines on Environmental, Social, and Governance (ESG) Reporting. Accra: GSE.

Article 4

# Sustainability as an Ethical Imperative

**CMA (Dr.) Aditi Dasgupta**
Joint Director
The Institute of Cost Accountants of India
Kolkata

**Abstract**

Sustainability is often framed as an environmental or corporate social responsibility (CSR) initiative. However, viewed through an ethical lens, it emerges as a moral imperative rooted in stewardship, intergenerational justice, and shared responsibility. This article explores sustainability as the ethical culmination of spiritually inspired leadership and values-based governance. It argues that sustainability must move beyond compliance and tokenism to become a principle embedded in organisational DNA—anchored in fairness, empathy, and long-term vision. Drawing from global and Indian examples such as Patagonia, Infosys, and Bhutan, it demonstrates how ethical governance can translate purpose into enduring impact for people, planet, and prosperity.

## From Governance to Ethical Sustainability

As discussed in the previous article, governance serves as the bridge between values and outcomes—translating intent into institutional practice. Sustainability represents the next logical step in this continuum, where the ethical and spiritual principles guiding leaders manifest in tangible impact. The triple crises of climate change, biodiversity loss, and inequality demand not just policy responses, but a moral awakening—an understanding that sustainability is a duty owed to both present and future generations.

## The Ethical Dimension of Sustainability

At its core, sustainability embodies three moral dimensions:

**Stewardship:** Recognising the Earth and its resources as a trust, not a possession.

**Responsibility:** Acting preventively to reduce harm rather than managing consequences reactively.

**Equity:** Ensuring fairness across communities and generations, preventing exploitation of vulnerable populations.

This ethical triad transforms sustainability from a management concern into a moral commitment to collective well-being.

## The Triple Bottom Line: A Moral Compass

The Triple Bottom Line—People, Planet, Profit—is more than a management framework; it is an ethical compass for decision-making.

**People:** Prioritising human dignity, labour rights, and community welfare.

**Planet:** Preserving ecosystems and ensuring climate resilience.

**Profit:** Pursuing economic viability that supports, rather than undermines, ethical and environmental goals.

Profit thus becomes a means to sustain human and ecological flourishing, not merely an end in itself.

## Beyond CSR: Integrating Ethics into Strategy

Corporate Social Responsibility often operates as an add-on—peripheral to the business core. Ethical sustainability demands integration:

**Supply Chain Responsibility:** Fair trade, humane working conditions, and reduced environmental footprints.

**Circular Economy Design:** Minimising waste and regenerating resources.

**Inclusive Growth Models:** Ensuring that economic success uplifts communities rather than marginalising them.

When sustainability becomes central to strategy, it shifts from philanthropy to purpose.

## Governance as the Enabler of Ethical Sustainability

Governance as the Enabler of Ethical Sustainability
Governance provides the structural backbone for ensuring that sustainability is not aspirational but actionable.

**Policy Alignment:** Embedding sustainability principles into mission statements and board charters.

**Transparency:** Integrating environmental and social metrics into annual reports alongside financial outcomes.

**Accountability:** Enforcing independent audits and stakeholder participation in evaluating performance.

Through such mechanisms, ethical governance transforms sustainability from an ideal into measurable institutional behaviour.

## SDGs as a Shared Moral Framework

The United Nations Sustainable Development Goals (SDGs) serve as a universal ethical map. They call upon nations, corporations, and individuals to align their pursuits with collective justice, peace, and prosperity.

Ethical leaders use SDGs to:
Align organisational strategy with planetary well-being

Build cross-sector coalitions for systemic transformation.

Measure impact in terms of human and ecological progress, not just financial gain.

## Climate Justice and Intergenerational Equity

Sustainability cannot be divorced from justice. Climate change disproportionately harms the poorest, making environmental policy a question of morality.

**Ethical leadership demands:**

- Advocacy for fair and inclusive climate policies.
- Investment in resilient infrastructure for vulnerable populations.
- Long-term thinking rooted in intergenerational equity—the conviction that future generations have an equal right to a habitable planet.

## Case Insight: Patagonia's Activist Business Model

Patagonia demonstrates how business can operationalise ethics.

Supports climate legislation and grassroots activism.

Donates 1% of sales to environmental causes.

Founder Yvon Chouinard transferred ownership to a trust ensuring all profits protect the environment.

This model redefines capitalism as a moral enterprise —where profit serves purpose and leadership becomes a form of stewardship.

## Indian Perspectives: Ethical Sustainability in Action

Infosys: Achieved carbon neutrality ahead of schedule through renewable energy, energy efficiency, and ethical employee engagement.

Tata: Integrates sustainability with trusteeship, reflecting founder J.N. Tata's belief that "community is not just another stakeholder—it is the very purpose of existence."

Bhutan: Pursues Gross National Happiness, maintaining over 70% forest cover as an expression of moral governance.

These examples reveal how ethics, culture, and governance converge to create sustainable legacies.

## Challenges and the Way Forward

Despite progress, challenges persist:

Short-termism undermines long-term sustainability.

Greenwashing erodes credibility and ethical standing.

Global complexity hampers monitoring across supply chains.

Sustainability is not an optional strategy but the culmination of a spiritual and ethical journey that began with purpose-driven leadership and evolved through values-based governance. It represents the moral fulfilment of our responsibility to humanity and the planet. By embedding sustainability into governance frameworks and ethical consciousness, leaders can ensure that prosperity today does not come at the expense of tomorrow.

*The next article in this series will weave together the series' central themes, showing how spirituality inspires ethical intent, governance translates that intent into systems of accountability, and sustainability manifests it as tangible impact. It will propose an integrated cyclical model where purpose, process, and outcome continuously reinforce one another to create enduring ethical leadership.*

# Sustainability - A Global outlook


## Monthly News

### 1. Singapore Names Three Carbon-Rating Firms to Enhance Integrity of International Carbon Credits

In Singapore, the carbon-credit offset regime is now gaining structured depth. The NEA announced on 7 November 2025 that BeZero, Calyx and Sylvera will form a ratings panel to support Singapore's governance of the ICC Framework. These firms bring ratings capability for assessing methodology and project design. Their appointment follows a competitive tender process launched in May 2025, during which firms were evaluated on expertise, track record, team qualifications and cost competitiveness.

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### 2. OPEC Fund Commits $1B to Accelerate Azerbaijan's Sustainable Infrastructure Push

Azerbaijan's infrastructure and clean energy agenda received a substantial lift this week as the OPEC Fund for International Development announced up to US$1 billion in development financing over the next three years. The commitment expands the country's access to long-term capital for water security, transport networks and sustainable urban planning, while deepening cooperation under the recently agreed Country Partnership Framework.

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### 3. EU Moves to Scale Back Sustainability Reporting and Due Diligence Rules for Large Corporations

The European Parliament has voted to sharply streamline the bloc's sustainability reporting and corporate due diligence obligations, advancing a package that would limit the scope of the rules to only the largest companies operating in the EU. The vote sets up a decisive negotiation with EU governments later this month as pressure mounts to balance climate and social oversight with competitiveness concerns across the region's business landscape.

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### 4. UK, EU Move Toward Linked Carbon Markets and Unified Agri-Food Rules

European ministers have cleared the way for formal negotiations with the United Kingdom on two agreements that could reshape the post-Brexit economic landscape: a shared sanitary and phytosanitary regime for agri-food trade and the linking of the EU and UK emissions trading systems. The move, endorsed by the EU Council, follows political commitments made at the May 2025 EU-UK summit.

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### 5. Singapore Launches Article 6.2 Protocol with Gold Standard and Verra

A new protocol published by Singapore's National Climate Change Secretariat, Gold Standard, and Verra sets out a unified system for countries to use existing independent carbon crediting standards to meet their Paris Agreement targets. The framework arrives as governments seek credible, cost-effective pathways to close widening gaps between current policies and their Nationally Determined Contributions. The Article 6.2 Crediting Protocol provides governments with a ready-made structure for engaging in cross-border carbon cooperation under the Paris Agreement

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### 6. ISSB Expands 'Global Passport' Framework to Align Sustainability Disclosure across Markets

The International Sustainability Standards Board (ISSB) is expanding its cross-border coordination network to accelerate the global adoption of its sustainability disclosure standards, aiming to prevent regulatory fragmentation as governments begin to integrate climate-related reporting into capital markets.

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## 7. France Reaffirms Support for World Bank Climate Finance Goals Despite U.S. Pressure

France's newly appointed development minister, Eleonore Caroit, has pledged that Paris will continue to defend the World Bank's climate finance mandate against U.S. efforts to roll it back. Speaking on the sidelines of the World Bank and IMF annual meetings, Caroit said France "will not give up" on the lender's 45% target for climate-related financing — a goal set under the Biden administration and now under threat from the Trump administration's renewed push for fossil fuel funding.

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## 8. SBTi Invites Companies to Pilot Draft Net-Zero Standard V2

A new protocol published by Singapore's National Climate Change Secretariat, Gold Standard, and Verra sets out a unified system for countries to use existing independent carbon crediting standards to meet their Paris Agreement targets. The framework arrives as governments seek credible, cost-effective pathways to close widening gaps between current policies and their Nationally Determined Contributions. The Article 6.2 Crediting Protocol provides governments with a ready-made structure for engaging in cross-border carbon cooperation under the Paris Agreement

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## 9. Morocco Sets 2040 Deadline to End Coal Power and Accelerate Renewables

Morocco has pledged to eliminate coal power by 2040, provided it can attract sufficient international climate finance to support the transition, according to the Powering Past Coal Alliance (PPCA). The announcement positions Morocco among a small group of emerging economies linking fossil fuel phase-outs directly to concessional finance, climate partnerships, and just transition funding.

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## 10. COP30 Opens in Belém with Technology-led Adaptation Drive, Major Finance Pledges

The global climate gathering in Belém, Brazil opened under a rare display of unity as delegates adopted the official agenda on day one and elevated technological innovation as a core pillar of adaptation. The election of André Corrêa do Lago as president of COP30 reinforced a message of delivery-oriented diplomacy.

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# Sustainability - Indian context


## Monthly News

### 1. India joins Brazil-led forest fund as observer, calls for stronger ambition

India welcomes and supports Brazil's initiative in establishing the Tropical Forests Forever Facility (TFFF), representing a significant step towards collective and sustained global action for the preservation of tropical forests. India is pleased to join the Facility as an observer

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### 2. India's Forest & Tree Cover Hits 25.17% of Geographical Area

The Ministry for Environment, Forest and Climate Change released the 18th India State of Forest Report 2023 (ISFR 2023). ISFR is brought out by the Forest Survey of India (FSI) on a biennial basis since 1987.

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### 3. Four TN districts get decarbonisation plan

TN government launched District Decarbonisation Action Plans (DDAPs) for four key districts – the Nilgiris, Coimbatore, Ramanathapuram and Virudhunagar – along with a State Climate Action Tracker that will enable real-time monitoring of the state's progress towards its net-zero goals.

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### 4. CAG integrates Sebi's ESG criteria into govt audits

The BRSR framework mandates top 1,000 listed companies to comply with a broad set of reporting requirements covering various ESG aspects. These include disclosures on environmental resource management, emissions, biodiversity, climate change mitigation and adaptation. These also cover social aspects, such as employee well-being, community engagement, human rights, and governance factors, including board diversity, ethics, anti-corruption measures, and risk management.

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### 5. Tamil Nadu's Large-Scale Palmyra Restoration Drive

The Green Tamil Nadu Mission (GTM) has set a target to dibble 3.5 million (35 lakh) palmyra seeds across 37 districts. Palmyra, the state tree, is drought-resistant, helps groundwater recharge, prevents soil erosion, and supports livelihoods—making it a climate-resilience asset. The drive is being tied to a "green Diwali" campaign (planting instead of firecrackers) to boost public participation.

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### 6. Environmental Justice: Post-facto Approvals Ruled Unlawful

In an editorial (citing a recent Supreme Court ruling), there is concern over post-facto environmental clearances being declared illegal. This has implications for environmental justice, regulatory compliance, and ESG risk — particularly for industries that may have sought after-the-fact clearances.

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### 7. State Education + ESG: Tamil Nadu Schools to Launch AI-Driven ESG Startup Programme

The Tamil Nadu School Education Department has approved an AI-driven commerce & startup program for ~2,000 students in Virudhunagar, led by the ESG CS Foundation. The "C.A.S.T." (Commerce Aptitude & Startup Talent) project aims to foster ESG mindset + entrepreneurship among school students. This is a novel move: integrating ESG into education at a sub-state, grassroots level.

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## 8. Growing ESG-Renewable Integration in India

In an editorial (citing a recent Supreme Court ruling), there is concern over post-facto environmental clearances being declared illegal. This has implications for environmental justice, regulatory compliance, and ESG risk — particularly for industries that may have sought after-the-fact clearances.

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## 9. Karnataka to Host Bengaluru Skill Summit 2025 to Boost Workforce Innovation

In an editorial (citing a recent Supreme Court ruling), there is concern over post-facto environmental clearances being declared illegal. This has implications for environmental justice, regulatory compliance, and ESG risk — particularly for industries that may have sought after-the-fact clearances.

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## 10. India delays climate pledge, pressures rich nations on funding at UN climate talks

India is unlikely to submit its climate pledge before the end of the annual United Nations climate summit, raising questions about how the world's most populous nation can influence others on confronting climate change.Experts say the delay may be a sign of India's displeasure with a lack of progress toward funding global climate priorities. However, this can also hurt its ability to lead at the climate talks in Brazil.

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## 11. Toxic Smog Engulfs New Delhi as Air Quality Hits 'Severe' Levels Ahead of Winter

A thick blanket of toxic smog enveloped the Indian capital on Tuesday, plunging air quality into the "severe" range and raising concerns about public health, particularly ahead of the winter season when cold air traps pollutants. The hazardous mix of smoke, emissions, and dust is an annual occurrence in New Delhi. Vehicles, construction activities, and agricultural fires in neighbouring states of Punjab and Haryana are primary contributors to the city's poor air quality.

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## 12. Next-generation ESG reforms in India through smart proteins and animal welfare

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# Artificial Rain

## Engineering the Skies for Sustainability

**CMA (Dr.) Aditi Dasgupta**
Joint Director
The Institute of Cost Accountants of India
Kolkata

**Abstract**

Artificial rain or cloud seeding, is a scientific method that induces precipitation by dispersing substances like silver iodide or dry ice into clouds. Initially an experimental weather control measure, it has evolved into a key tool for drought relief, pollution reduction, and sustainable water management. This paper reviews the global and Indian experiences–from Dr. S.K. Banerji's pioneering 1952 experiment in Kolkata to modern AI-assisted cloud seeding projects in the UAE and China. It critically evaluates environmental and ethical challenges such as chemical residues, ecological imbalance, and cross-border impacts. The study also highlights the emerging role of cost and management accountants in ensuring financial, ethical, and environmental accountability through ESG reporting, cost-benefit analysis, and risk-based auditing. Integrating science, technology, and governance, the paper concludes that responsible regulation and multidisciplinary collaboration are essential to make artificial rain a sustainable and equitable climate adaptation strategy.

## Introduction

Artificial rain, or cloud seeding, represents one of humanity's most intriguing interventions in nature — the attempt to make clouds rain on command. Initially conceived as a scientific experiment, it has evolved into a global strategy for tackling drought, enhancing water security, and even cleansing polluted air. As climate extremes intensify, nations are turning to this technology with renewed urgency, though not without debate and caution.

## The Science Behind Artificial Rain

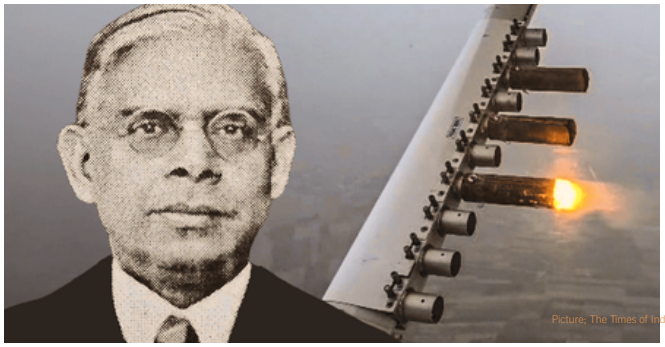
Cloud seeding works by introducing particles — typically silver iodide, potassium iodide, dry ice, or sodium chloride — into clouds through aircraft, rockets, or ground-based generators.

These particles act as nuclei, encouraging water vapor to condense into droplets heavy enough to fall as rain. The effectiveness of the technique, however, depends heavily on atmospheric conditions: there must be enough moisture and suitable cloud structures for seeding to succeed

## Applications and Advantages

Artificial rain has been used across multiple sectors. In agriculture, it provides crucial irrigation support in drought-stricken regions, safeguarding food production and rural livelihoods. It also contributes to water resource management by replenishing reservoirs and recharging groundwater. Urban policymakers have adopted it for environmental reasons — notably, to suppress dust and wash pollutants from the air, as seen in pilot projects in Delhi. In forested or dry regions, increased rainfall can mitigate wildfire risks and stabilize local humidity.

## India's Pioneering Legacy




Few realize that India's engagement with cloud seeding began earlier than most nations. In 1952, Dr. Sudhanshu Kumar Banerji, the first Indian Director General of the India Meteorological Department (IMD), conducted the country's first successful artificial rainfall experiment in Jadavpur, Kolkata. Without aircraft or advanced machinery, Dr. Banerji used hydrogen balloons carrying silver iodide and dry ice, releasing them into the atmosphere. The experiment produced near-daily rainfall, so much so that residents complained of waterlogging. His results, documented by the Council for Scientific and Industrial Research (CSIR) in 1955, earned him recognition as India's first "rainmaker

Dr. Banerji's innovation was decades ahead of its time — a reminder that scientific imagination can often surpass material resources. Modern projects, such as the Delhi government's 2023–2024 trials with IIT Kanpur to combat smog, continue his legacy. States like Maharashtra, Karnataka, and Tamil Nadu have also experimented with rainmaking to alleviate drought. While success remains variable, India's continued investment in atmospheric research reflects a growing commitment to climate resilience

## Global Practices and Emerging Technologies

Despite its promise, artificial rain remains contentious. Environmentalists raise concerns over chemical residues from silver iodide and other agents that can accumulate in soil and water, potentially affecting aquatic life and ecosystems. Prolonged or unregulated operations risk disrupting natural weather cycles or causing unintended rainfall shifts that may trigger floods or landslides.

Health experts caution against exposure risks, particularly for workers handling seeding materials or communities living near operational sites. In India, concerns have emerged about asthma aggravation linked to silver iodide aerosols.

Moreover, cloud seeding raises thorny ethical and legal issues: if rain is induced in one region, does it deprive another of precipitation? This so-called "rain theft" has already caused friction between neighbouring states and countries.

The economic argument is equally complex. Cloud seeding involves high operational costs and uncertain returns, especially when atmospheric conditions are unsuitable. Its effectiveness remains variable, making it a supplementary measure rather than a standalone solution to water scarcity.

### Country-Specific Challenges

China faces environmental risks from chemical accumulation and geopolitical criticism over large-scale weather manipulation.

The UAE, while technologically advanced, grapples with sustainability concerns and possible health effects from aerosolized particles.

India, though innovative, continues to struggle with inconsistent outcomes and insufficient long-term environmental assessments.

The United States contends with fragmented regulations and interstate disputes over rainfall rights.

These experiences underscore the need for a harmonized global framework governing weather modification.


## The Role of Cost and Management Accountants: Steering Sustainable Weather Governance

While meteorologists and engineers drive the technical aspects of cloud seeding, management accountants have a critical, often overlooked, role in ensuring that these projects are financially viable, ethically managed, and environmentally accountable.

1. **Strategic Decision Support**

Cost and Management accountants apply cost-benefit analysis, scenario modeling, and sustainability accounting to assess whether cloud seeding projects justify their investment. They help policymakers weigh the economic benefits of enhanced rainfall against the costs of equipment, chemicals, and potential environmental remediation.



2. **Performance Measurement and Reporting:**

By integrating Environmental, Social, and Governance (ESG) metrics into performance frameworks, management accountants ensure that weather modification aligns with national sustainability goals. They can develop Climate Impact Accounting Models to measure rainfall yield per cost unit, or carbon and chemical footprints of each mission.

3. **Risk Management and Compliance:**

Cloud seeding involves financial, legal, and environmental risks. Cost and Management accountants contribute through risk-based auditing, ensuring adherence to environmental standards, exposure limits, and international weather treaties. They play a governance role in ensuring that funding and operations remain transparent and accountable.

4. **AI and Data Ethics Oversight:**

As AI systems increasingly guide cloud seeding, Cost and Management accountants can ensure algorithmic accountability — verifying that AI-driven decisions are unbiased, cost-efficient, and environmentally justified. They bridge the gap between technical data analytics and ethical financial governance.

5. **Sustainability Integration:**

Through frameworks like the Integrated Reporting (IR) and BRSR Core (Business Responsibility and Sustainability Reporting), Cost and Management accountants advocate for disclosure of cloud seeding's environmental and social impacts, reinforcing public trust and institutional credibility.

In essence, Cost and Management accountants become financial stewards of environmental innovation — ensuring that science serves society responsibly, sustainably, and transparently.

## Towards Responsible Governance

A sustainable approach to artificial rain must balance innovation with accountability. Governments should mandate regular monitoring of soil and water quality in seeded regions, coupled with environmental impact assessments before operations begin. Health and safety standards must define permissible exposure levels to seeding agents, supported by public health tracking in operational zones.

International treaties are crucial to managing transboundary weather effects and ensuring equitable water distribution. Legal mechanisms should allow compensation for communities adversely affected by unintended rainfall or ecological disruption. Transparency remains central: cloud seeding schedules, data, and results should be publicly disclosed, promoting trust and scientific collaboration.

## The Future of Rainmaking

Cloud seeding is not a cure-all for drought or pollution, but a complementary tool in climate adaptation. With AI-driven forecasting, biodegradable seeding materials, and strict environmental oversight, the practice can become more efficient and sustainable. Adaptive licensing and periodic audits will ensure that weather modification aligns with evolving ecological realities.

As India and the world refine their cloud seeding strategies, Dr. S.K. Banerji's pioneering 1952 experiment remains a symbol of visionary science — an early proof that human curiosity, when guided by responsibility, can indeed engineer the skies for sustainability.

For a crystal perspective, click the video below to view an audio-visual snapshot of the article.

Video generated by author

Click the play button

**References:**

1.www.news18.com
2.www.fritzenergy.com
3.www.responsibleus.com
4.www.gao.gov
5.www.zerogeoengineering.com
6.www.water.ca.gov
7.www.jagranjosh.com
8.www.movcac.com
9.www.thedailyjagran.com
10.www.forthworthjournals.org
11. www.wionews.com


# The Rise of ESG in India

## Green, Inclusive and Accountable

**Anagha Krishnan**
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**Abstract**

ESG (Environmental, Social and Governance) is a single framework that brings integrates planet-friendly policies and people-focused practices bringing in a more sustainable, ethical, and resilient results. Sustainability is an important issue that helps businesses become more resilient, improve their reputation, work more efficiently, and manage risks. It also supports bigger goals for the planet and its people. ESG sets the stage for sustainability by looking at the long-term environmental stewardship, social equity, and solid governance, which are all necessary for sustainable growth and trust amongst the stakeholders.

## The ESG framework

The ESG framework is an extensive tool that assist organisations assess and address their impacts and obligations across three key domains Environmental, Social and Governance. The environmental dimensions focus on how and what a business does to have minimal effect on the natural ecosystem. This dimension covers:

Resource efficiency means using less energy and water.

Keeping biodiversity safe.

Practices of circular economy such as waste reduction, recycling, and sustainable product design.

Controlling emissions and the overall impact on the environment, the environmental footprint.

The social dimension looks at how an organisation interacts with its employees, customers, and the larger community. This dimension encompasses:

·Fair working conditions and preservation of labour rights

·Diversity, fairness, and inclusion.

·Health, safety, and well-being of employees.

·Community engagement and making a good difference in society.

The governance dimension delves into the intern processes and controls that ensures transparency ar ethical conduct. This dimension encompasses:

·Transparency and accountability in decision-making and reporting.

·Adherence to ethical business standards and legal compliance.

·Safeguarding the rights of shareholders.

·Transparency in leadership.

The ESG framework helps businesses identify risks and potential associated to sustainability and moral conduct. It further guides organisations in making choices consistent with long-term social and environmental priorities, thus acting as a strategic tool for integrating sustainable and responsible practices into business operations.

## The People, Planet and ESG

A 2023 Harvard Business Review (HBR) analysis demonstrated that organisations with robust ESG performance experienced a 15% increase in employee retention and a 12% enhancement in productivity relative to their peers. In an ESG framework, people and the planet are very closely linked (Stanton House, n.d.).

Effective ESG policies foster a strong connection between employees and the organization's purpose, resulting in more engaged, productive, and contented teams, as employees recognise their work's positive impact on society and the environment. The people-planet connection in ESG is strong in places where sustainability programs are in place that promote social inclusion, community involvement, and environmental protection at the same time. This creates a shared benefit for both present and future generations.


## Current standing of India in ESG

In India, ESG is steadily gaining momentum with companies increasingly recognising the need for aligning their strategies and operations with ESG principles, integrating sustainability initiatives into their core activities. A study by Sharma & Dangwal (2020) projected that, with the rising global trends and investor pressure ESG developments have had a big impact on Indian companies who are now focusing beyond compliance to genuine sustainability efforts.

The Global Reporting Initiative (GRI) and the Sustainability Accounting Standards Board (SASB) are two international frameworks that have helped most Indian corporates standardise their ESG reporting. Standardization helps improve transparency and comparability of ESG data, which is essential for investors and stakeholders assessing corporate sustainability. In India, GRI standards are widely used to comply with both global best practices and compliance requirements.

For example, SEBI's Business Responsibility and Sustainability Report (BRSR) requires top-listed businesses to present full ESG disclosures. The combination of GRI with the Indian framework helps create a more complete ESG story that includes governance, strategy, stakeholder engagement, environmental impact, and social responsibility. This establishes trust with global investors and enables them to build a long-term value.

The growing value of ESG ratings inspires companies to systematically improve their environmental, social, and governance standards, thereby enhancing not only their investment attractiveness but also their sustainability leadership internationally (ICSI, 2023).

Many Indian businesses have made a great stride progress by integrating a wide range sustainability initiatives, such as trimming down on carbon emissions, deploying renewable energy, managing waste, and preserving natural resources. A few remarkable sustainability initiatives are listed below:

Tata Motors, a leading automobile manufacturer in India has installed solar panels at its Pune plant, by completely switching towards renewable energy, thereby achieving a substantial reduction in its carbon emissions and energy costs (Tata Motors, 2022). Larsen & Toubro (L&T), an engineering construction company has been keen on maintaining its resource efficiency in its projects by minimizing generation of waste as well as optimizing the material use. (Larsen & Tuobro, 2022). Hindustan Unilever has implemented zero waste initiatives through recycling and reusing of waste materials, thereby promoting sustainable disposal practices. (HUL, n.d.). A 2021 report from Tata Steel reveals that the company has adopted water efficient technologies and practices such as rainwater harvesting and recycling within its premises. Infosys through its innovative building design and energy efficient systems in its campuses has focused on reducing its per capita electricity consumption (Infosys, n.d.).

The proactive commitment to sustainability initiatives by these Indian businesses demonstrates their stride towards eco-friendly and green practices that have less of an impact on the ecosystems. This collective action reflects a strengthening commitment towards environmental responsibility, creating a more stable and versatile business landscape across the country.

Some Corporate Social Responsibility (CSR) initiatives that has had significant impact includes: "Swachh Aadat, Swachh Bharat" campaign of Hindustan Unilever (HUL) that encourages sustainability, hygiene, and sanitation while also empowering women in rural regions. Rural development and environmental sustainability are prioritised by ITC Limited, with programmes like the "e-Choupal" network helping farmers. Mahindra & Mahindra is also committed to Corporate Social Responsibility (CSR) and sustainability initiatives that encompasses skill development, healthcare, and environmental conservation.

The initiatives undertaken by these corporate entities exemplify a diverse array of corporate social responsibility initiatives, thereby illustrating fidelity towards addressing significant societal challenges. With the burgeoning Indian corporate sector, the implementation of standardised reporting frameworks has become imperative for enhancing transparency and accountability.

A single framework for sustainability reporting makes it easier for organisations to report on their ESG efforts regularly. This lets stakeholders evaluate and compare performance more precisely and consistently. Standardisation not only enhances the clarity of ESG challenge identification but also improves regulatory compliance, thereby simplifying reporting procedures for organisations.

## Emerging opportunities in the Indian Context

GRI and BRSR are encouraging Indian companies to go beyond just data and provide sustainability disclosures that are deep, credible, and impactful. The transition from numbers to stories supported by reliable facts in sustainability reporting brings in the change, which ultimately leads to a greener, fairer economy thereby closing the gap between intention and action. The ESG reporting of corporates provides a comprehensive account outlining the rationale behind their selected strategies, elucidating how their initiatives impact communities, ecosystems, and economies, while emphasising both beneficial results and inadvertent effects. This reporting helps to effectively highlight the primary challenges associated with implementing sustainable practices and identify areas where additional enhancements and innovations are necessary ( ProIndia, n.d.)

The adoption of strong Environmental, Social, and Governance (ESG) principles within India has the potential to catalyse a significant transformation of the corporate landscape, promoting enhanced environmental responsibility, substantive social involvement, and elevated governance practices. Addressing the problems with data collecting and reporting systems, poor regulatory and enforcement frameworks, and the urgent need for enhancements to technology infrastructure will make ESG reporting easier for Indian enterprises. Standardising the reporting of ESG principles can facilitate the resolution of challenges inherent in existing reporting practices. Policies that are in place also play a big part in making this change happen through targeted actions and procedures

Talking about the ESG rating, MSCI ESG ratings helps companies assess how financially relevant are environmental, social, and governance risks and opportunities. Ratings tend to range from AAA (highest) to CCC (lowest) and are benchmarked relative to industry peers.

Each company is evaluated based on two to seven material environmental and social key issues that are chosen based on its specific risk exposure. The rating also considers whether the company is positioned to meet growing market demand for environmentally or socially beneficial products and services. Overall, the assessment weighs a company's ESG risks against its management practices, including policies, targets, performance metrics, and controversies (MSCI, 2024).

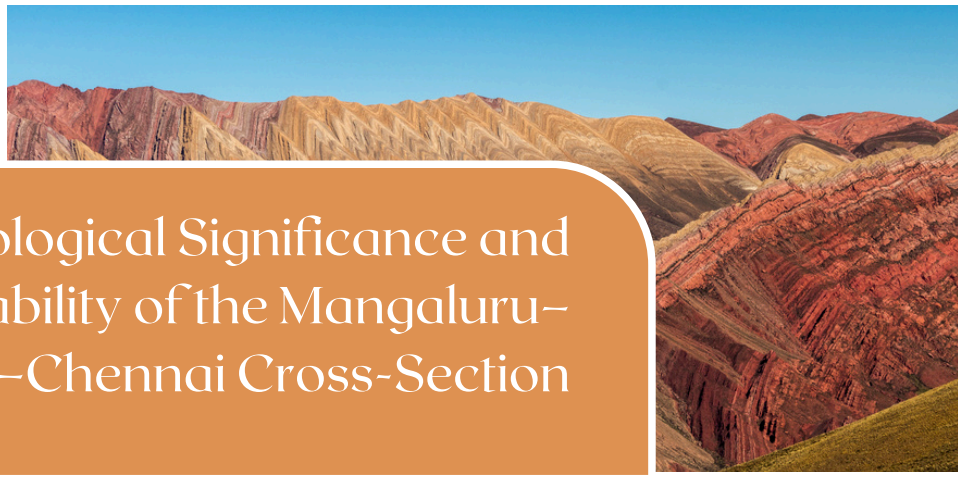
## The Path Ahead

The next step is to make sure that national development is in line with global sustainability goals (SDGs). India is slowly but surely moving towards aligning its national development strategy with global sustainability goals (SDGs) by incorporating ESG concepts into legislation, corporate reporting, and other activities. By integrating "People, Planet, Profit" into SDG-ESG reporting, a balanced approach that benefits societies, conserves natural resources, and promotes business resilience can be achieved, leaving India more sustainable, competitive, and a leader in the world.

Indian businesses are working towards purpose-driven sustainability projects that would help them reach global goals while also solving environmental and social problems. A clear and thorough set of reporting requirements that follow international standards is the basis for consistent and useful ESG reporting. To equip businesses with essential knowledge and resources, regulatory authorities must invest in training programs and capacity-building initiatives, thereby promoting awareness of the significance of ESG adoption and effectively integrating these elements into their reporting frameworks. Investing in the growth of data infrastructure and technology platforms is important to make data collecting, analysis, and reporting easier and more efficient. This will improve the accuracy and reliability of ESG disclosures.

**References:**

1. Stanton House. (n.d.). How ESG positively impacts people, planet, profits. Stanton House. https://www.stantonhouse.com/career-resources/how-esg-positively-impacts-people-planet-profits
2. The Institute of Company Secretaries of India. ICSI. https://www.icsi.edu/media/webmodules/CSJ/October/12.pdf
3. Larsen & Toubro Ltd. (2022). Investor Relations 2022 [Annual Report]. Larsen & Toubro. https://investors.larsentoubro.com/pdf/IR%202022.pdf
4. Infosys Ltd. (n.d.). Pioneering net-zero buildings. Infosys. https://www.infosys.com/about/corporate-responsibility/documents/pioneering-net-zero-buildings.pdf/
5. Tata Steel Ltd. (2022). Natural capital (Integrated Report 2021–22). Tata Steel. https://www.tatasteel.com/investors/integrated-report-2021-22/natural-capital.html
6. Hindustan Unilever Ltd. (n.d.). Sustainability: Plastics. HUL. https://www.hul.co.in/sustainability/plastics/
7. ProIndia. (n.d.). How GRI and BRSR are shaping the future of sustainability reporting in India. ProIndia. https://proindia.net/how-gri-and-brsr-are-shaping-the-future-of-sustainability-reporting-in-india/
8. MSCI ESG Research LLC. (2024, April). MSCI ESG Ratings Methodology. MSCI Inc. https://www.msci.com/documents/1296102/34424357/MSCI+ESG+Ratings+Methodology.pdf
9. Tata Motors Limited. (n.d.). Our leadership. Tata Motors. Retrieved from https://www.tatamotors.com/about-us/leadership/



# Geological Significance and Sustainability of the Mangaluru–Bengaluru–Chennai Cross-Section

**CMA Arunabha Saha**
Practising Cost Acountant
Thane

**Abstract**

The land between Mangaluru on the Arabian Sea and Chennai on the Bay of Bengal tells a fascinating story of India's geological past and its link to sustainability today. This cross-section shows how tectonic forces, erosion, and sedimentation have shaped the Western and Eastern Ghats, the Deccan Plateau, and the coastal plains. The region's geological structure influences its rivers, soil, and coastal systems – all of which are vital for human life and economic activity. Understanding this geology is not only important for scientists but also for policymakers, planners, and professionals like Cost and Management Accountants (CMAs), who can help design sustainable development strategies that reduce future disasters and protect resources for generations to come.

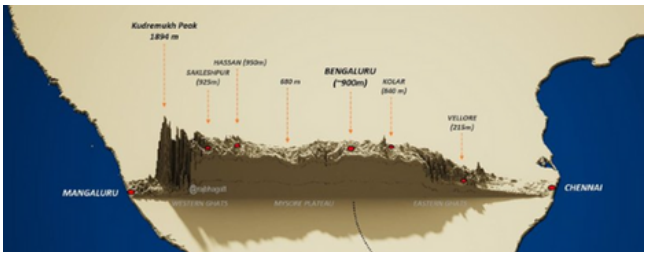
## Introduction

The Mangaluru–Bengaluru–Chennai cross-section cuts across one of India's most diverse landscapes. Starting from the narrow, rocky western coastline, the land rises sharply to form the Western Ghats, then stretches across the Deccan Plateau, and finally slopes gently toward the Eastern Ghats and the flat eastern coastal plains. This region shows how tectonic forces, erosion, and climate together have shaped southern India. It also helps us understand how geology continues to affect water systems, agriculture, urban growth, and vulnerability to natural hazards like floods, landslides, and coastal erosion.

## 1 Geological Significance

### 1.1 The Asymmetrical Landform

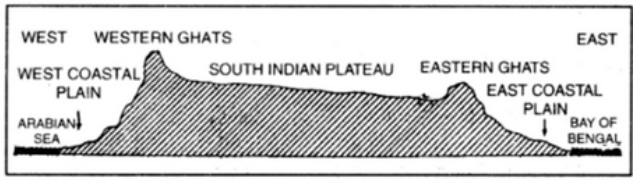
The profile is asymmetrical — with a steep rise on the west (Western Ghats) and a gradual slope toward the east. The Western Ghats were formed by tectonic uplift and faulting, while the gentler slopes toward the east result from erosion over millions of years. This pattern shows how the Indian plate's movement northward and Precambrian rifting shaped the present-day terrain.




### 1.2 Drainage and River Systems

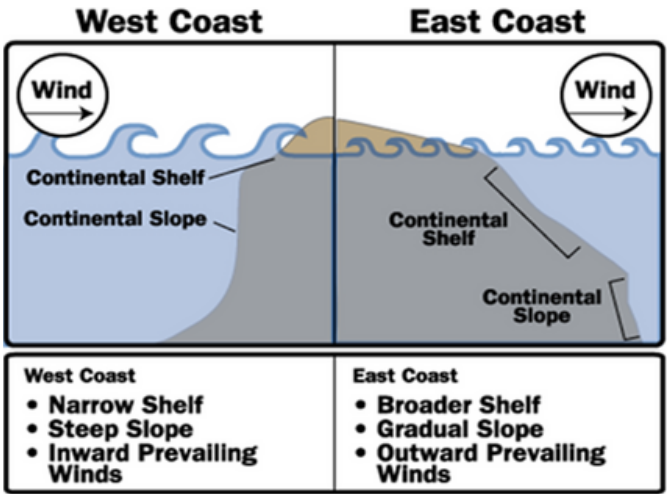
The steep slopes on the west lead to short, fast-flowing rivers like the Netravati, which drain quickly into the Arabian Sea. On the other hand, long rivers such as the Cauvery, Krishna, and Godavari flow eastward, forming large deltas near the Bay of Bengal.

These rivers are the backbone of water supply and agriculture, but their flow and sediment load are directly linked to the geological gradient and rainfall pattern.



### 1.3 Coastal Evolution

The western coast has a narrow continental shelf and steep terrain, which prevents large delta formation. The eastern coast, however, has a wide and stable shelf, allowing the growth of fertile river deltas.
This difference also affects how these coasts respond to sea-level rise and coastal erosion — the flatter eastern coast being far more vulnerable to floods




### 1.4 Ongoing Geological Activity

Though the region is considered stable, minor fault reactivations, landslides, and coastal erosion continue. The lateritic soils of the Western Ghats, the basaltic Deccan Plateau, and the alluvial plains of the east each respond differently to rainfall and weathering, influencing agriculture, construction, and water management.

## 2 Sustainability Dimensions

### 2.1 Water Resources

The east-flowing rivers are lifelines for irrigation and drinking water. However, changing rainfall patterns and overuse of groundwater threaten their sustainability. Droughts in the Cauvery and Krishna basins already show how climate variability can strain both agriculture and urban life.

Sustainable water management — through rainwater harvesting, watershed restoration, and better irrigation practices — is crucial to maintain long-term water balance.

### 2.2 Agriculture and Land Use

The fertile soils of the eastern plains support crops like rice, sugarcane, and pulses. However, agriculture depends heavily on river water and monsoon rains.

With rising temperatures and uneven rainfall, farmers face increasing risks. Promoting soil conservation, drip irrigation, and crop diversification can make agriculture more climate-resilient and sustainable.

### 2.3 Coastal Vulnerability

The eastern coastal plains face the highest risks from sea-level rise, cyclones, and storm surges. Coastal erosion threatens not only beaches but also houses, roads, and ports. By contrast, the western coast is steeper and less affected by flooding but prone to landslides during heavy rains. Developing early warning systems, coastal vegetation buffers, and regulated construction zones can reduce these risks.

### 2.4 Economic Activity

Ports, industries, and urban centers like Mangaluru, Bengaluru, and Chennai depend on geological stability. Understanding the terrain helps in designing safer infrastructure.
For example, mapping fault zones before building large projects or assessing soil strength for metro and road systems can prevent costly damages later. Sustainability in such areas also means reducing industrial waste, managing coastal pollution, and maintaining balance between growth and the environment.

### 2.5 Natural Hazards

The Western Ghats experience landslides, the plateau region faces soil erosion, and the east coast suffers from flooding and cyclones. These are not separate problems but connected outcomes of geology, land use, and climate. Integrated hazard mapping and region-specific planning can save lives and resources.

## 3 Reducing Future Disasters: What Care Should Be Taken

To reduce future disasters, a mix of scientific understanding, community awareness, and sustainable policy actions is required. Key measures include:

**1.** By taking these precautions, future generations can live safely while maintaining ecological balance and protecting livelihoods.

**2.** Water and Soil Conservation Preventing soil erosion through terracing, vegetation cover, and check dams can protect river basins and reduce flood impacts.

**3.** Sustainable Urban Growth Cities like Bengaluru and Chennai should adopt climate-smart planning — with improved drainage, green zones, and limits on groundwater extraction.

**4.** Climate Adaptation through Green Infrastructure Use of permeable pavements, rain gardens, and sustainable drainage systems in urban areas can reduce flood risk while improving groundwater recharge.

**5.** Disaster Preparedness and Early Warning Systems Continuous monitoring of rainfall, seismic activity, and coastal changes should guide timely evacuation and response measures.

**6.** Community Participation Local people should be trained and informed about the geological risks and how to respond to disasters. Community-based adaptation is the most effective approach.

**7.** Climate Adaptation through Green Infrastructure Use of permeable pavements, rain gardens, and sustainable drainage systems in urban areas can reduce flood risk while improving groundwater recharge.

By taking these precautions, future generations can live safely while maintaining ecological balance and protecting livelihoods.

## 4 Role of a Cost and Management Accountant (CMA) in Building Sustainability

While geologists and environmental scientists study the earth's structure, CMAs play a vital role in translating sustainability goals into economic and operational strategies. In this region, CMAs can make strong contributions in the following ways:

**1.** Evaluating Cost of Environmental Degradation CMAs can help measure the economic impact of soil loss, water scarcity, and resource depletion — making the cost of inaction visible to decision-makers.

**2.** Implementing Green Accounting Systems By integrating environmental costs into financial reports, CMAs ensure that industries and government bodies recognise the long-term value of natural resources.

**3.** Promoting Resource Efficiency CMAs can help industries in the region adopt efficient energy, water, and material use, reducing waste and operational costs.

**4.** Supporting Disaster Preparedness Budgets Through cost-benefit analysis, CMAs can highlight how investments in early warning systems, infrastructure resilience, and risk mapping save money in the long term.

**5.** Encouraging Sustainable Agriculture and Supply Chains CMAs can help farmers' cooperatives and agribusinesses develop sustainable pricing and investment models that promote soil and water conservation.

**6.** Advising Governments and Municipal Bodies, CMAs can help design sustainability-linked budgets and performance metrics that ensure public spending aligns with environmental and social goals.

**7.** Advising Governments and Municipal Bodies, CMAs can help design sustainability-linked budgets and performance metrics that ensure public spending aligns with environmental and social goals.

By connecting environmental data with financial systems, CMAs bridge the gap between geological reality and economic decision-making, ensuring that sustainability is not just an environmental goal but a measurable business practice.


## Conclusion

In today's fast-paced world, IM has made work faster, but not necessarily more thoughtful. Hence, being mindful in communications is the need of the hour, and demonstrates one's credibility. By choosing the right channel, respecting other's boundaries, being clear and courteous, and being intentionally thoughtful and warm, we can make mundane conversations and professional workflows into things to which one looks forward. SB

## Acknowledgment:

Grateful thanks to Mr. Shankar Nath Chaudhuri, former Director, Geological Survey of India, for his valuable insights and guidance about the geology of Deccan Plateau.

Vasudhaiva Kutumbakam

VK Webinar Series of the Sustainability Standards Board

# 44th Webinar

# Symbiotic Existence

14th November 2025 4pm- 5:15pm

CMA (Dr.) Aditi Dasgupta

CMA (Dr.) Subrahmaniya Sivam R

It was the 44th Vasudhaiva Kutumbakam Series on 14th November 2025 on the theme "Symbiotic Existence", introduced briefly by CMA (Dr.) Aditi Dasgupta, Joint Director (SSB), who set the intellectual foundation for the discussion.

The esteemed speaker, CMA (Dr.) Subrahmaniya Sivam R, then deliberated on the profound philosophy that life thrives through interdependence, not independence, drawing from the Pancha Bhootas and explaining the challenges faced by each elemental force in the modern world. The eminent speaker further connected ancient Vedic wisdom with contemporary sustainability frameworks such as ESG, BRSR, and the NGRBC Principles, supported by industry case studies on carbon emissions, water security, circularity, supply chain responsibility, and climate transition. He enriched his presentation with references from the Upanishads, Rig Veda, Thirukkural, and the Bhagavad Gita, stressing ethical duty, harmony with nature, and responsible corporate conduct. He concluded with the powerful message that humanity must evolve from a parasitic mindset to a symbiotic existence, giving back more than it takes from society and the environment.

The seminar was very well attended, and participants made the session interactive by engaging with thought-provoking questions and reflections. The webinar concluded with a warm and formal Vote of Thanks delivered by CMA (Dr.) Aditi Dasgupta, Joint Director, SSB, bringing the session to an enriching close.

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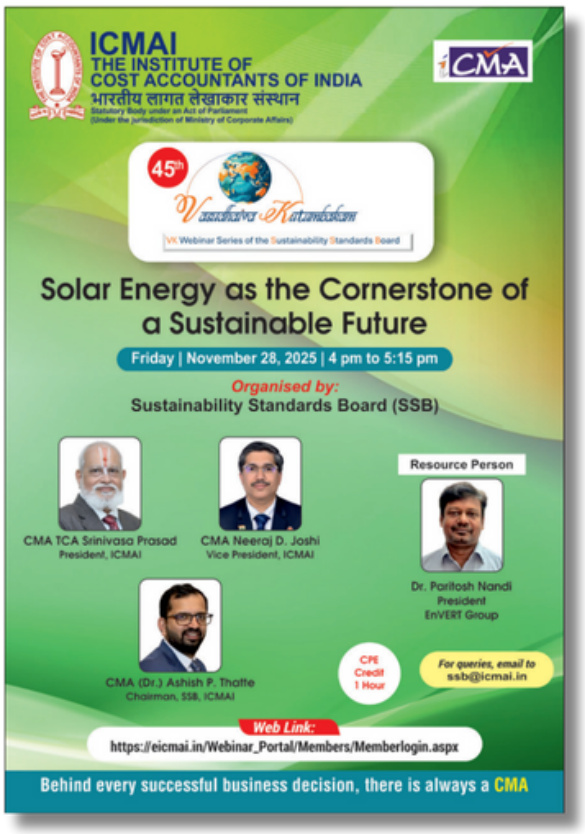



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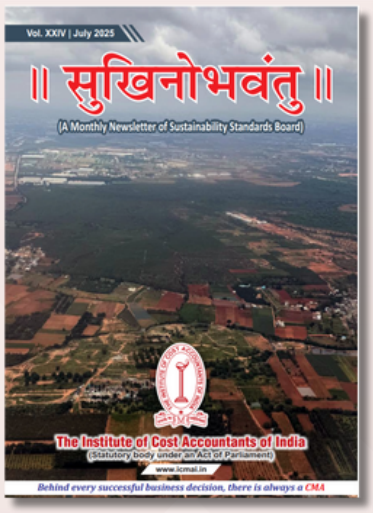


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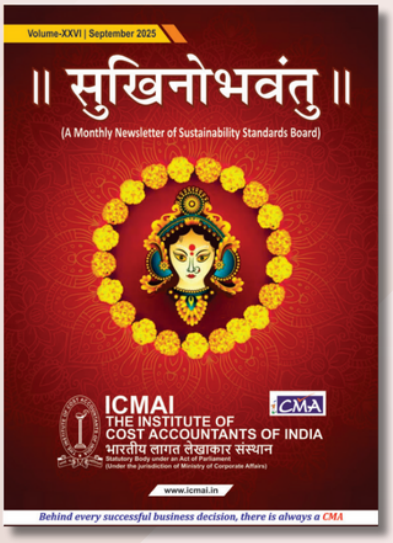


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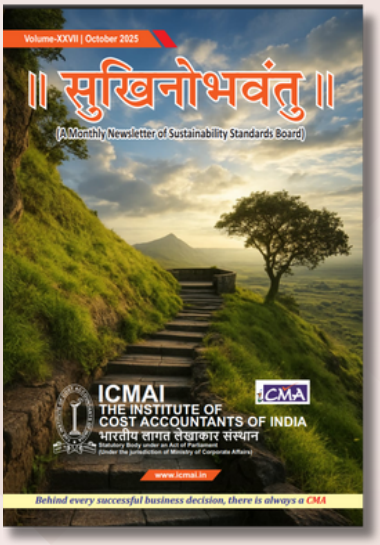


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# Professional Etiquettes – Time to Untangle

Part XIII

## The Art of Instant Messaging in Professional Environments

**Usha Ganapathy Subramanian**
Practicing Company Secretary
Chennai

### Introduction

Today, the professional landscape is marked with work-from-home options, hybrid setups and cross-functional teams spread across geographies. While the COVID pandemic contributed to the necessity for such collaboration, it was rendered possible only by the technological advances of today. Instant messaging applications like WhatsApp, Telegram, MS Teams, Slack and when it comes to small businesses and gig economy, even Instagram DMs have become the go-to tools for professional communication. These are fast, informal and often offer security features too. However, they also become ripe ground for misunderstandings and boundary violations. The very aspects that make instant messaging effective also make it something that requires mindful and nuanced handling. We must remember that instant messaging does not mean we can afford to be less courteous or careful.

### Choosing the Right Channel

Not everything belongs in a WhatsApp or Teams chat. We must refrain from using Instant Messaging (IM) for messages that need structure, nuance or retention for reference or records. On the other hand, we can use IM when we need a quick update or clarification, when we are sending reminders or alerts, or when we are collaborating in real-time with stakeholders located elsewhere.

E-mail would be ideal when the message needs detailed context, explanation, evidence or needs to be sent with attachments. It is also ideal when delivering legal or statutory documentation or require record-keeping for evidence.

Policy updates, formal requests, would be examples where email is ideal. Some form of alerts or reminders would also ideally require email since they would require proof of delivery – for example, payment reminders.

Using calls or in-person meetings will serve better when the issue is sensitive, significantly complex or likely to be misinterpreted when human gestures and tone are absent. They are also ideal when we expect a deeper discussion or when emotions could flare up. However, before calling anyone especially on their personal mobile number, it is better to request their availability. This demonstrates respect for the other person's time and boundaries, which leads us to our next discussion.

### Respecting the Recipient's Time and Boundaries

IM platforms often have a way of letting others know when someone is available. Just because someone is "online" or "available" does not mean they are available to reply or take calls. Also, just because a person replies fast, does not mean they are available on call. Further, they may be "online" to engage with personal contacts but not for professional ones. Hence, the best practice would be to avoid sending messages outside of traditional working hours unless it is urgent. Further, expecting real-time replies should not be done unless it was agreed upon earlier. Messages and emails could also be scheduled for the next working day if delay is affordable. Further, when we happen to be away during the times that we would normally be available, using "Do Not Disturb" or "Away" statuses could help others manage their expectations.

## Being Courteous and Concise

While it is acknowledged that compared with the formality that email carries, IM is casual. However, it need not be careless. A few poorly written lines could make or break relationships. For example, when thanking someone it is always better to say it in full words and use some form of "Thank you for your kind gesture" or "Thank you very much for your help!", we must avoid shortening it to "Tks" or "Tku". The shortened versions most often than not come across as rude, abrupt, and less grateful.

We must always begin with a greeting like "Good Morning Mr. ____/Sir/Madam" with seniors or clients, or "Hi _____" if it is a casual exchange with colleagues. We must keep the message short but clear. Using bullet points and line breaks will greatly improve readability if it is slightly longer or has distinct points. Ending with an appreciation or a clear sign-off is also courteous at the end of the exchange, like, "Thank you, have a great day!"

Among the things to avoid, the first would be to type in all caps (it is generally considered that we are shouting or angry if we use all caps). Sending five or six one-line messages in a row must also be avoided. We must also avoid open-ended questions like, "Hi! I need a help from you. Can we talk over a call?" and leaving it there. Every request must be detailed enough that the recipient can make up their minds and are not caught off-guard on a call. Further, detailing the request will help the recipient of the message to gather more resources to accede to the request.

## Minding the Tone and Using Emojis Wisely

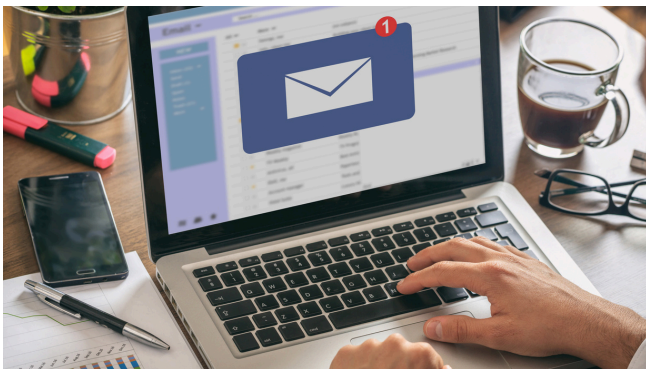
Tone cannot be perceived when we use text to communicate. A message may sound calm and courteous to the sender but may come across as passive-aggressive or rude to the recipient. A simple example would be "Thanks a lot!" Depending on the tone one imagines when reading it, it may be very courteous or very passive-aggressive! We would do well to reread the messages before sending, especially when in rush or frustrated.

Using emojis may sometimes clarify the context. However, emojis cannot always be used when communicating with clients or seniors. Hence, they may be used sparingly or appropriately. Further, giving a thumbs up when we mean to thank someone is often not considered courteous.

We must also avoid forwarding jokes, memes or using sarcasm that may not translate well. They are to be altogether avoided in formal communication. Further, using abbreviations like "FYI" or "LOL" may well be avoided in professional or work groups.

## Group Chat Etiquette

In group chats and channels, we must be more careful. Any side conversations must be moved to DMs. Replies should be tagged to the messages to which the reply is being sent for better clarity. If a discussion group is being closed, summarising action points will be in order. In any new group, it is better to observe the group dynamics before participating in the discussions. We must be respectful of the group's purpose, members and practices.



## Handling Mistakes Gracefully

If a message was sent to a wrong chat, deleting and quickly acknowledging that it was sent to the group or person and apologising for the inconvenience would be ideal. If the message came across as unclear, a quick clarification would be wise.

It is very important that we remain patient while waiting for replies instead of sending a rash "????"! If there is a significant delay in responding, we may open with a quick note, like "Sorry for the delay."

## Ending Conversations Clearly

Confusion on the next course of action could arise when chats trail off without closure. Hence, we may say something on the lines of, "Thank you! I will get back on this." Or "Sure, I will share the file by EOD and inform you." Clear closing lines respect the other person's time and avoids second-guessing.

## Conclusion

In today's fast-paced world, IM has made work faster, but not necessarily more thoughtful. Hence, being mindful in communications is the need of the hour, and demonstrates one's credibility. By choosing the right channel, respecting other's boundaries, being clear and courteous, and being intentionally thoughtful and warm, we can make mundane conversations and professional workflows into things to which one looks forward. SB

*Reproduced with suitable modifications from the personal writings and posts of Ms. Usha Ganapathy Subramanian.*

# Thane's First Oxygen Park: A New Green Lung for a Growing City

**CMA (Dr.) Aditi Dasgupta**
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In a refreshing step toward urban ecological revival, Thane has inaugurated its first Oxygen Park — Rajmata Jijau Udyan in Manpada, offering a much-needed green lung to the rapidly growing city. Spread across 3.5 acres and developed under Thane's Urban Garden Development Program with an investment of ₹4 crore, the park aims to enhance air quality, support community well-being, and provide a calming, restorative space amid fast-paced urbanisation.

The park is densely planted with over 15,000 trees and plants representing more than 100 native and medicinal species, including Gudmar, Adulsa, Haldi, Citronella, Camphor, Bael, and Rudraksha. Its design preserves heritage banyan and pipal trees, while an additional 500 bamboo plants, known for their high oxygen-generating capacity, further boost the park's ecological impact. The space features a 500-metre walking trail, meditation zones, an artificial pond, and eco-sensitive lighting that protects nocturnal biodiversity. Sculptures of Ayurvedic masters such as Dhanvantari, Charaka, and Sushruta bring cultural depth to the experience.


Importantly, the educational component of the park — such as the QR-coded trees — helps raise awareness among residents about air pollution and the value of green spaces in improving air quality, making the park not just recreational but also knowledge-building.


The launch of this Oxygen Park comes at a crucial moment for Thane, where AQI levels have been worsening, often touching "Unhealthy" ranges of 157 to over 250 during peak pollution periods. Long-term MPCB data indicates persistent particulate pollution, especially from 10pm.

To combat this, the municipal corporation has been expanding sustainable initiatives like bamboo plantations along major corridors. Though visitor data is not yet formally recorded, trends from similar parks—such as the NaMo Grand Central Park with a capacity of 5,000 daily visitors—suggest that Rajmata Jijau Udyan will likely draw strong public engagement given its wellness, educational, and environmental focus.

With its rich biodiversity, ecological learning features, and community health benefits, Thane's Oxygen Park stands as a forward-looking model for sustainable urban development, offering residents a chance to breathe cleaner air, reconnect with nature, and experience a more balanced urban life.

The SSB appreciates the dedicated efforts of CMA Arunabha Saha for visiting the park and providing valuable inputs that contributed to the development of this feature.

# Traditional Grain Storage and Food Security

Part XIX

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**Abstract**

Even as the world is taking giant strides in AI and blockchain, food security remains a question mark for a large segment of the population. While significant advances have been made in agricultural productivity, post-harvest losses still continue to loom large. According to the Food and Agriculture Organization and the United Nations Environment Programme, around one-third is the food is wasted and the figure goes up to 40% if on-farm losses are included.[1] Of these, 13.2% is estimated from harvest till the retail stage and 17% is at the consumer level (Gulati et al., 2024).[2] This shows that the problems are both structural and behavioural. While the wastage at the consumer end can be chalked out to behavioural causes, the post-harvest till retail stage losses can reasonably be thought to be caused by structural factors. While the world is exploring climate-controlled warehouses and AI-enabled supply chains to counter this, it is also time to go back to our roots and rediscover our traditional grain storage techniques that sustained our communities for centuries. Our ancient methods of storage were rooted in a deep understanding of the local ecology and were decentralised, low-cost and environment-friendly.

## Traditional Storage Techniques

For many centuries, Indian farmers, especially those in rural and tribal areas, developed indigenous and ingenious storage systems tailored to their local agro-climatic zones. Some of the traditional storage techniques are outlined below:

**Mud Bins (Kothis)**: In north and central India, farmers built cylindrical or cubical bins with sun-dried mud mixed with cow dung and straw. These were naturally cool, moisture-resistant, and insect-repellent. These are especially found in rural areas of Bihar (Ashok et al., 2018.)[3]

**Morai structures:** Common in the Eastern and Southern States of India, these are used for storage of grains like paddy, maize, etc. They can hold from 3.5 to 18 tonnes.

Resembling an inverted cone and are placed on a raised platform. The entire structure is made of eco-friendly materials like timber, bamboo, ropes, etc (Ashok et al., 2018.)[4]

**Kanaj structures:** Popular in Karnataka and Maharashtra, these cylindrical structures are made from bamboo splits. The walls of the structure are sealed with mud plaster and have a storage capacity of 1 to 20 tonnes (Ashok et al., 2018). [5]

**Hagevu:** These are underground pits lined with straw ropes to prevent moisture. It could also be built as an indoor structure. It is sealed with mud plaster to create an oxygen-free internalenvironment and control the moisture content. This is followed in some places like Gadag in Karnataka.[6]

**Granaries on Stilts:** Moving a little further away from Indian models, we can also take inspiration from the granaries on stilts prevalent in the Iberian Peninsula.[7] Community granaries were built on stilts to prevent moisture and animal and pest intrusions.

If we observe the above structures and methods carefully, all of them use locally available, biodegradable materials, use minimal energy, and support community-level grain management.

[1] https://www.wri.org/insights/how-much-food-does-the-world-waste
[2] Ashok Gulati, Raya Das, and Alex Winter-Nelson, Reducing Post-Harvest Losses in Indian Agriculture: A Case Study of Selected Crops (New Delhi: Indian Council for Research on International Economic Relations, April 2024), https://icrier.org/pdf/Policy_Brief_20.pdf .
[3] Ashok, B. Gowda, & N. M. Shakunthala. (2018). Different types of grain storage structures for the betterment of livelihood of Indian farmers. International Journal of Pure & Applied Bioscience, 6(4), 190–198. https://doi.org/10.18782/2320-7051.6721
[4] ibid
[5] ibid
[6] https://www.newindianexpress.com/states/karnataka/2022/Apr/17/natures-storeroom-2442996.html#:~:text=It%20lies%20in%20the%20black,this%20tradition%20of%20many%20centuries.
[7] https://en.wikipedia.org/wiki/H%C3%B3rreo

## The Natural Pest Management Options

Instead of chemical fumigation, traditional systems used neem leaves, ash, tulsi, dried chillies or turmeric to ward off pests and insects from the pulses and grains. Further, the daily cooking smoke acted as a natural pest repellent for the grains stored in the upper sections of dwellings. These methods ensured safe and pest-free storage without contaminating the environment or endangering human health.

## Why These Systems Still Matter Today

Despite industrial-scale warehouses and scientific pest control, India continues to face high post-harvest losses. Further, dependence on centralised systems means that they are not suited for the local micro-climate and weather conditions. It also leads to inequitable access to storage. This leads to marginal farmers having to sell produce at distress prices due to lack of access to storage.

Reviving traditional storage systems can help to decentralise and democratise food security, enable buffer stocking to bear with climate shocks and market failures. This could also promote micro enterprises or cooperative and community-based enterprises in natural grain storage and pest control systems.

## Aligning with Sustainability Goals

The traditional practices align well with modern sustainability frameworks like the Sustainable Development Goals (SDGs) of the United Nations. They directly help achieve the following goals:

SDG 2 (Zero Hunger) by reducing post-harvest losses directly and improving food availability at a local level.

SDG 12 (Responsible Consumption and Production) by promoting waste reduction and usage of local resources.

SDG 13 (Climate action) by ensuring a very low carbon footprint compared to energy-intensive cold storage chains.

Further, these storage systems adhere to the circular economy principles by promoting the use of biodegradable materials and reuse of agricultural waste.

From a cost and management accounting perspective also, these systems demonstrate low lifecycle costs, minimal capital investment, and high socio-environmental ROI.

Recognising their importance, some institutions and governments have begun to integrate these models. For example, the Value Addition, Research & Development (VARD) Department of National Innovation Foundation (NIF) has documented hundreds of rural grain storage innovations[8].

## Reimagining Cost-Effective Rural Storage Today

Over time, some of the sustainable elements in these mechanisms came to be replaced by cement, plastic and harsh chemicals. And many of them were replaced by centralized, carbon-intensive cold storage mechanisms. Modern versions of these age-old designs may be developed using compressed earth blocks or lime plaster instead of cement or plastic, coating with organic pest repellents instead of chemical ones. Solar dryers could be used to ensure safe moisture levels pre-storage.

There is immense potential in this revival not just for food security and ecological conservation but also in empowering communities to reduce dependency on expensive infrastructure, maintain sovereignty over their produce and ultimately reclaim their livelihoods and autonomy.

## Conclusion

India's indigenous grain storage systems have evolved as a result of centuries of observation, adaptation and innovation – all with sustainability and equitable food security in mind. The years that followed the industrial revolution changed the topography of food supply chain systems by making way for carbon-heavy intrusions. Although the modern supply chains provide short-term efficiencies, they have failed to remedy the environmental damage and the social inequities that they led to. Revival of the indigenous grain storage systems is not about turning the clock back but about drawing forward the wisdom of the civilization that inherently balanced productivity with preservation.

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[8] https://nif.org.in/vard_agriculture

# Ancient Nalanda and Taxila Seeds of Environmental Consciousness and Sustainability through Education

## (Linking to SDG 4 – Quality Education)

**CMA (Dr.) Aditi Dasgupta**
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**Abstract**

Long before sustainability became a global development goal, the ancient universities of Nalanda and Taxila stood as luminous beacons of holistic education that harmonized human intellect with nature's rhythm. These centers of learning, which flourished between 5th century BCE and 12th century CE, were not merely academic institutions but thriving ecosystems of environmental wisdom, sustainable living, and ethical education. Their pedagogical models resonate profoundly with the spirit of Sustainable Development Goal 4 (SDG 4) – "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all."

## Education Rooted in Ecological Wisdom

Both Nalanda and Taxila cultivated a worldview where knowledge was inseparable from nature. Students and teachers lived amidst expansive monasteries, gardens, and water reservoirs—self-sufficient ecosystems that embodied the principles of sustainable living.

Nalanda's architectural layout incorporated water harvesting systems, lotus ponds, and green courtyards, designed to maintain ecological balance and support thousands of resident scholars.

Taxila, located near fertile valleys and rivers, emphasized agrarian studies and practical observation of flora and fauna, fostering respect for natural resources.

Such integration of nature into the learning environment reflected a deep ecological consciousness, centuries before the modern notion of environmental education emerged.


## Knowledge Systems that Promoted Sustainability

The curricula of both universities embraced a multidisciplinary approach — encompassing not only philosophy and grammar but also medicine (Ayurveda), agriculture, astronomy, architecture (Vāstu Shastra), and ethics.

**Agricultural sciences:**
Courses emphasized soil conservation, crop rotation, and water management—core aspects of sustainable agriculture.

**Ethical governance (Arthaśāstra traditions):**
Scholars studied models of just resource distribution and environmental stewardship as duties of governance.

Through these teachings, the universities advanced a values-based education system that linked human progress to ecological responsibility — an early prototype of sustainability education.

## Community Living and Social Sustainability

Nalanda and Taxila were inclusive learning communities that drew students from across Asia — China, Korea, Tibet, Sri Lanka, and beyond. This multicultural exchange fostered intellectual diversity and global citizenship, echoing SDG 4's vision of inclusive and equitable learning.

**The ashram-style residential model emphasized:**

Shared resources and minimalism – discouraging material excess.

Collective responsibility – maintaining common spaces, gardens, and water systems.

Ethical living – aligning personal discipline (śīla) with societal and environmental harmony.

These principles ensured not only environmental but also social sustainability — a community model that nurtured compassion, cooperation, and respect for all forms of life.

## Linking to SDG 4: Quality Education for Sustainable Futures

The pedagogical legacy of Nalanda and Taxila aligns closely with the four pillars of SDG 4:

Equitable Access – Education at these universities was open to seekers from various regions, faiths, and social backgrounds, demonstrating early forms of inclusive education.

Holistic Quality – Learning extended beyond academic instruction to include moral, environmental, and spiritual growth.

Lifelong Learning – Knowledge was viewed as a continuous journey toward wisdom, not a transactional pursuit of livelihood.

Education for Sustainable Development (ESD) – Their integrated approach to ethics, ecology, and economy directly anticipated modern ESD frameworks.

Thus, these universities represent the ancient foundations of SDG 4, proving that quality education has always been a conduit for sustainable civilization.

## Lessons for the Modern World

Revisiting the educational ethos of Nalanda and Taxila offers timeless lessons:

Curriculum Integration: Sustainability should not be confined to environmental science but woven into ethics, governance, economics, and the arts.

Campus Sustainability: Educational institutions must function as green ecosystems—much like Nalanda's self-sufficient campus.

Value-based Pedagogy:
Knowledge must nurture empathy, restraint, and respect for the natural world.

In this way, the spirit of Nalanda and Taxila can be reborn in modern universities as living laboratories of sustainability and global harmony.

Nalanda and Taxila were not only repositories of knowledge but also guardians of the Earth's wisdom. Their education systems blended intellect with intuition, scholarship with stewardship, and progress with planetary balance. As the world strives toward achieving SDG 4 – Quality Education, these ancient models remind us that true education is not only about learning to live but learning to live sustainably — in harmony with oneself, society, and the environment.

## References:

1. Altekar, A. S. (1951). Education in Ancient India. Varanasi: Nand Kishore & Bros.
2. Basham, A. L. (1954). The Wonder That Was India. London: Sidgwick & Jackson.
3. Ghosh, A. (Ed.). (1965). Nālandā: Its Excavations and Recent Discoveries. New Delhi: Archaeological Survey of India.
4. Chattopadhyaya, D. P. (1991). History of Science and Technology in Ancient India: The Beginnings. New Delhi: Oxford University Press.
5. Singh, Upinder. (2008). A History of Ancient and Early Medieval India: From the Stone Age to the 12th Century. New Delhi: Pearson Education.
6. Thapar, Romila. (2002). Early India: From the Origins to AD 1300. Berkeley: University of California Press.
7. Sen, S. N. (1999). Ancient Indian History and Civilization. New Delhi: New Age International.
8. UNESCO. (2014). Education for Sustainable Development (ESD) in Asia-Pacific: Experiences and Innovations. Paris: UNESCO Publishing.
9. United Nations. (2015). Transforming Our World: The 2030 Agenda for Sustainable Development. New York: United Nations. (Particularly SDG 4: Quality Education).
10. Kumar, Satish. (2017). "Nalanda: The World's First Residential University." Journal of Indian Education, 43(2), 15–26.
11. Sharma, R. S. (2006). India's Ancient Past. New Delhi: Oxford University Press.
12. Pande, G. C. (2010). Foundations of Indian Culture. Delhi: Motilal Banarsidass.
13. Dash, N. (2019). "Environmental Ethics in Ancient Indian Thought." Indian Journal of Environmental Philosophy, 7(1), 21–34.
14. Baruah, B. (2018). "Sustainability and the Ancient Indian Knowledge Systems: A Philosophical Reflection." Indian Journal of Humanities and Social Sciences, 9(3), 45–53.
15. World Bank & UNESCO. (2020). Education for Sustainable Development: A Roadmap. Washington, D.C.: World Bank Publications.

# *The Future is Clear:* Solar Glass and the Path to Sustainable Living

Insight VI

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**Abstract**

Solar glass—also known as transparent photovoltaic (PV) glass—is a new and exciting step toward clean and sustainable energy. It looks like ordinary glass but can produce electricity from sunlight. This technology brings together design, science, and environmental care, turning windows and glass walls into hidden sources of power. Beyond being a scientific success, solar glass is changing how we build and live sustainably.

## Introduction

Imagine if buildings could make their own electricity instead of only using it. Windows and glass facades that generate power from sunlight are now a reality. Solar glass makes this possible by converting sunlight into clean energy while keeping the glass clear and attractive.

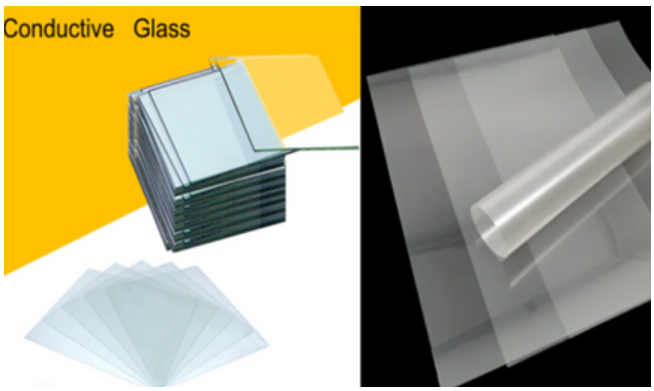
The modern idea of sustainability is not only about saving energy—it's about finding ways to produce it from our everyday surroundings. Solar glass helps achieve this by turning normal glass surfaces into small, clean power plants that support both design and sustainability.

## How Solar Glass Works

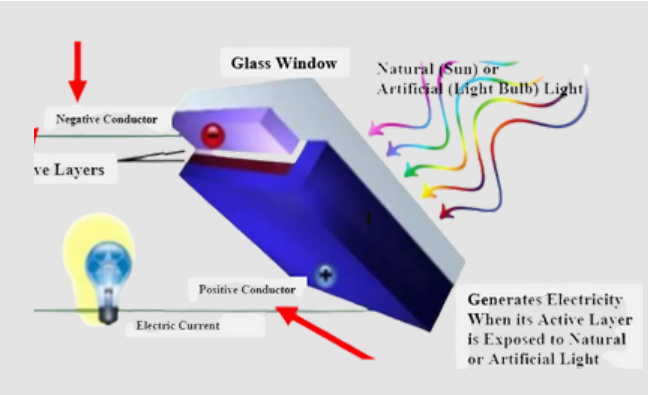
Transparent solar panels look like normal glass, but they are built with special layers that absorb invisible parts of sunlight—mainly ultraviolet (UV) and infrared (IR) light. The visible light still passes through, keeping the glass clear.

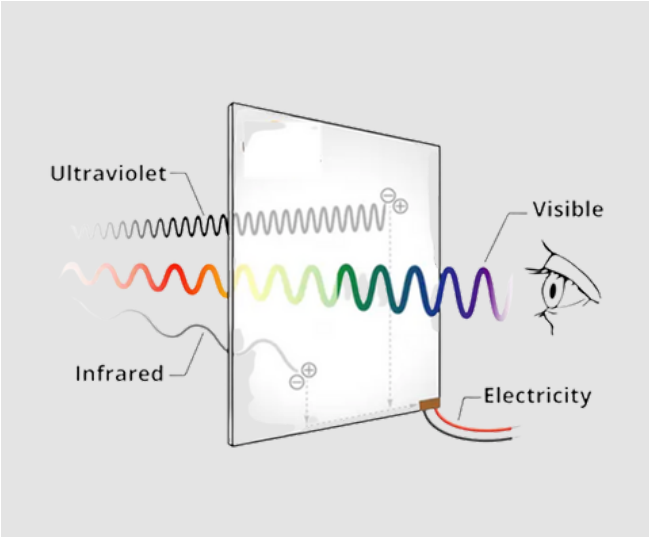
When the UV and IR light hit these layers, they excite electrons and produce electricity—a process called the photovoltaic effect.

The energy then flows through transparent conductive coatings, such as Indium tin oxide (ITO) or graphene, without affecting visibility.




New materials such as perovskites {a family of materials with a specific crystal structure, named after the natural mineral calcium titanate ($CaTiO_3$)}, organic photovoltaic polymers (a class of materials used in solar cells to convert sunlight into electricity), and quantum dots now allow up to 12% power efficiency while keeping 50–70% transparency. This means the window can look completely normal while quietly producing clean energy.




**Coating on Glass is made up ultra small organic solar cells that combine to form 3 ultra-thin layers**

**1st** layer of transparent coating applied to glass surfaces to make it safe to carry electricity.

**2nd** ultra-thin semi-transparent layer of chemical capable of absorbing light energy to create electricity.

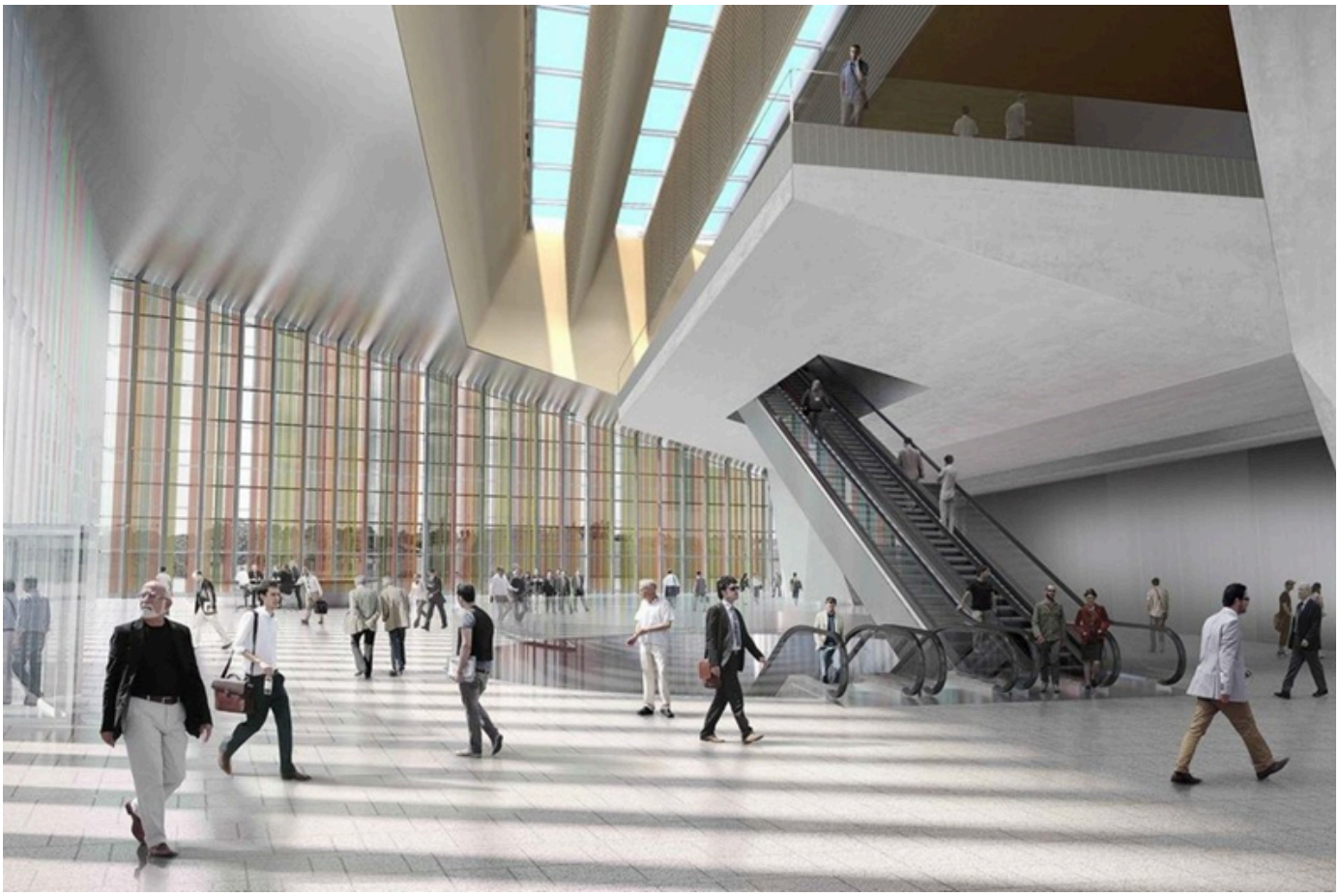
**3rd** layer allows for transference of electricity.

## From Lab Discovery to Real Buildings

The first fully transparent solar cell was made in 2014 by Professor Richard Lunt and his team at Michigan State University.

Since then, technology and material improvements have moved solar glass from research labs to real-world use.

Companies now produce solar coatings and smart windows that generate electricity and control building temperature. A great example is the Copenhagen International School in Denmark, which uses more than 12,000 semi-transparent solar panels on its facade—producing over half of the school's total energy needs.



Swiss Tech Convention Centre (EPFL, Lausanne, Switzerland)

Such examples show how solar glass can reduce fossil fuel use while making buildings more beautiful and energy efficient.

## Sustainability Benefits

Solar glass helps the environment in many ways:

**1. No Extra Land Needed:**
It uses existing glass surfaces like windows and facades, so no extra land is required.

**2. Less Carbon Emission:**
It generates clean energy directly from buildings, reducing fossil fuel use.

**3. Better Energy Efficiency:**
The glass blocks harmful UV rays and lowers cooling costs inside buildings.

**4. Supports Recycling:**
Many solar glass panels are made from recyclable materials, helping the circular economy.

This innovation supports key United Nations goals such as affordable and clean energy (SDG 7) and Climate Action (SDG 13)

## Economic Value: Turning Cost into Profit

Solar glass is not just eco-friendly—it also makes financial sense. Each square meter of glass can produce about 20–30 watts of electricity. For large buildings, this means big energy savings over time. It converts a simple window—once only a cost—into an energy-generating asset.

Lower electricity bills, higher building value, and stronger Environmental, Social, and Governance (ESG) ratings make solar glass a wise investment. Green financing options also support companies adopting such renewable technologies.

## Role of Cost and Management Accountants (CMAs)

Cost and Management Accountants have an important role in this green transformation. They help businesses plan, monitor, and report the economic and environmental impact of new technologies like solar glass.

**Their contributions include:**

**1. Life-Cycle Costing (LCC):**
Evaluating total costs over the entire life of solar glass —from installation to recycling.

**2. Environmental Management Accounting (EMA):**
Measuring and reporting environmental benefits like reduced emissions and energy savings.

**3. Capital Budgeting and ROI Analysis:**
Using financial tools (NPV, IRR, Payback) to assess the profitability of solar glass projects.

**4. Carbon Accounting:**
Quantifying how much carbon emission is saved and including it in ESG reports.

**5. Policy and Incentive Analysis:**
Helping governments and industries develop better financial models and green incentives.

**6. Green Financing Guidance:**
Assisting companies in accessing funds through green bonds or sustainability-linked loans.

CMAs are financial experts who connect environmental goals with business performance.

## Solar Glass in Smart Cities

Solar glass fits naturally into the idea of Smart Cities—urban areas that use technology to manage resources wisely. Tall buildings with transparent solar panels can generate power exactly where it's used, reducing grid pressure.

CMAs can support smart city planning by:

- Estimating cost savings from local renewable generation.
- Designing public–private partnership models.
- Conducting audits and reporting sustainability performance.

Solar glass can automatically adjust energy generation and use—creating cities that manage energy efficiently and sustainably.

## Challenges

Although promising, solar glass faces some challenges:

- Lower Efficiency: Current transparent panels produce less power than traditional opaque panels, though research is improving results quickly.
- Durability Issues: Materials like perovskite are sensitive to moisture and sunlight, but improved coatings are solving these problems.
- High Cost: Manufacturing is still expensive but expected to fall with larger-scale production.
- Policy Gaps: Stronger government support and incentives will help faster adoption.

Here too, CMAs can contribute by analysing cost factors, building economic models, and suggesting financial plans that balance innovation and affordability.

## The Road Ahead

Solar glass is a key part of the move toward net-zero emissions. When installed widely across buildings, it could reduce urban energy needs by up to 40–50%. By 2030, it may become a standard feature in new construction projects.

CMAs will play a leading role in this journey by:

- Creating cost and performance frameworks for green energy use.
- Ensuring that investment in green technology delivers measurable results.

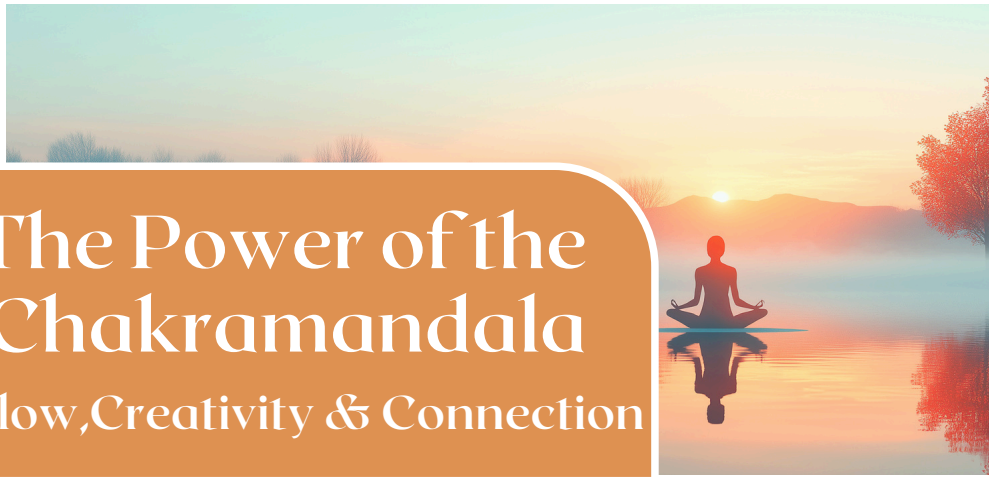
## Conclusion

Solar glass marks the start of an "invisible solar revolution." It turns sunlight into power without changing how our buildings look. It is clean, efficient, and elegant—a perfect mix of technology and sustainability.

As the world aims for a net-zero future, CMAs will help measure, manage, and monetise this transformation—ensuring that the light entering our windows also lights up the path to a cleaner tomorrow.

**References:**

1. https://www.ecoticias.com/en/invisible-%E2%80%95-goodbye-to-solar-panels/13656/
2. https://www.weforum.org/stories/2022/09/transparent-solar-panel-windows/



# The Power of the Sacral Chakramandala

## Awakening Flow,Creativity & Connection

**Geeta Joshi Brahme**
Founder Sun N Soul
Certified Mandala Therapist

"When we allow life to flow through us like water, creativity blooms, relationships deepen, and we begin to live in harmony with ourselves and the world."

### The Essence of Swadhisthana:

Within the sacred system of seven chakras, the Sacral Chakra — Swadhisthana, meaning "one's own abode" — is the glowing orange seat of emotion, pleasure, and creativity. Located a few inches below the navel, it governs how we experience joy, intimacy, and artistic expression. Like the element of water, it teaches us to move with life's tides — flowing rather than resisting.

A balanced sacral chakra fills life with passion, flexibility, and creative inspiration. When blocked, it causes emotional detachment and creative stagnation; when overactive, it can lead to emotional overwhelm or addictive patterns.

### What Does the Sacral Chakra Do?

*In both ancient and modern perspectives, this energy centre supports:*

- Emotional awareness and healthy expression
- Creative imagination and innovation
- Sexual vitality and relational harmony
- Adaptability to change
- Joy, spontaneity, and a sense of inner flow

Physically, it aligns with the pelvic region, reproductive organs, and lower abdomen, influencing hormonal balance and vitality. Spiritually, it transforms raw emotion into inspired creation — guiding us to live more sensually and soulfully.

### What Does the Sacral Chakra Do?

Like any current, energy it can ebb or overflow.
Underactive (Blocked) Chakra

- Low libido, lack of desire or enthusiasm
- Emotional numbness or avoidance
- Creative block, fear of change
- Isolation or disconnection from others
- Stiffness or discomfort in the hips and pelvis

### Overactive Chakra

- Overindulgence in pleasure or impulsive behaviour
- Emotional instability and mood swings
- Co-dependency or blurred boundaries
- Addiction to excitement or validation

Awareness of these patterns is the first step in restoring emotional and energetic equilibrium.

### Balancing the Sacral Chakra:

Rebalancing Swadhisthana is about movement, creativity, and release — reconnecting body and emotion through mindful flow.

**1. Move the Pelvis**
Practice hip-opening yoga postures, belly dancing, or swimming. The sacral chakra thrives on rhythm and motion. Scientific studies on yoga and pelvic therapy show improved pelvic function and emotional wellbeing through mindful movement.

**2. Connect with Water**
Take intentional baths, swim, or simply sit near water bodies. Visualize orange light flowing through your lower abdomen, washing away emotional residue. Water soothes, cleanses, and restores inner peace.

**3. Express Creatively**
Draw, paint, write, or dance — without judgment. Creative expression reconnects you to the joy of being alive and helps release suppressed feelings.

**4. Practice Breath and Visualization**
Sit quietly and breathe into your lower belly. Imagine a glowing orange lotus spinning gently below your navel. With every exhale, release fear or guilt; with every inhale, invite vitality and joy.

**5. Heal Relationships and Boundaries**
Balancing this chakra includes emotional maturity — cultivating empathy while maintaining boundaries. Healthy relationships mirror inner balance.

**6. Somatic and Mind-Body Therapies**
Pelvic physiotherapy, mindful bodywork, or trauma-informed counselling can help release stored tension. Research confirms that integrating mindfulness with physical therapy reduces pelvic pain and anxiety, supporting both body and emotion.

## Practice of the Month: "Flow Meditation" *(Do it for 5 minutes daily)*

Purpose: To awaken the water element and emotional ease.

1. Sit comfortably, spine tall, hands resting on your belly.

2. Close your eyes. Take deep, slow breaths into the pelvic area.

3. Visualize warm orange light swirling like gentle waves below the navel.

4. With each breath, let the light move in slow, rhythmic circles.

5. Whisper inwardly: "I flow with life. I honour my emotions. I create with joy."

6. Continue for five minutes, ending with gratitude for your body's wisdom.

This practice gently reawakens creativity, sensuality, and emotional grace — the essence of Swadhisthana.

## Benefits of a Balanced Sacral Chakra

When the sacral chakra flows harmoniously:

- Creativity and imagination surge effortlessly.
- Emotions feel manageable and expressive.
- Relationships become nurturing and authentic.
- Pleasure, sensuality, and vitality deepen.
- One feels open, adaptable, and joyful.

Balanced Swadhisthana brings emotional resilience and zest for life — qualities that nourish both personal happiness and collective wellbeing.

## What Science Suggests:

Though chakras are symbolic in modern science, mind-body research supports many of their principles.

Yoga & Pelvic Health: Improves pelvic strength, emotional regulation, and vitality.

Mindfulness & Pain Management: Reduces pelvic pain and enhances relaxation.

Creative Expression Therapies: Boost emotional intelligence and mental flexibility.

Breathwork Studies: Show measurable calming effects on the nervous system.

Thus, the language of energy aligns with the neuroscience of embodied regulation — living with awareness, movement, and emotional coherence.

## From Inner Flow to Environmental Sustainability:

Balancing the sacral chakra does more than enhance personal pleasure — it nurtures creative sustainability. When we reconnect with simple, soulful joy, we consume less and create more. Pleasure becomes mindful, not exploitative.
Creativity leads to innovation that respects life. Emotional empathy extends naturally to nature itself. Just as water sustains all life, inner flow sustains outer balance. A person aligned with their sacral energy acts with fluidity, compassion, and reverence for the Earth — creating a ripple of sustainability through every thought and deed.

## Conclusion

The sacral chakra invites us to celebrate life in all its sensual and emotional richness. It reminds us that flow is freedom — the freedom to feel, to create, to connect, and to care. When we nurture this orange centre of vitality, we awaken not only personal joy but also the creative consciousness the world so deeply needs.

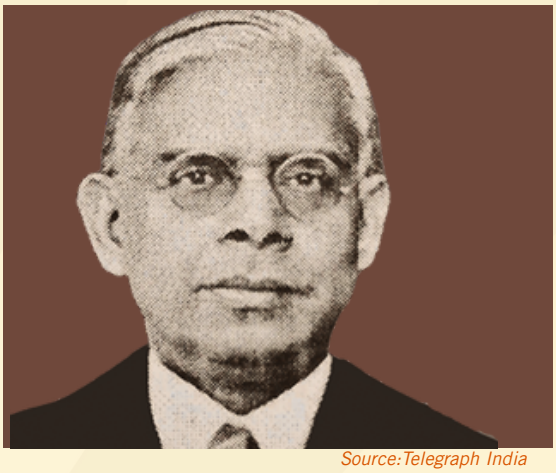
DO YOU KNOW?

# Dr. S.K. Banerji's Pioneering Artificial Rain Experiment

Long before Delhi's recent cloud-seeding project with IIT Kanpur, Kolkata scientist Dr. Sudhanshu Kumar Banerji—the first Indian Director General of the India Meteorological Department—succesLong before Delhi's recent cloud-seeding project with IIT Kanpur, Kolkata scientist Dr. Sudhanshu Kumar Banerji—the first Indian Director General of the India Meteorological Department—successfully created artificial rain over Jadavpur in 1952. Nicknamed "Megh Banerji", he achieved nearly 100% success using hydrogen balloons and silver iodide vapour, decades before such technology became common globally.

A mathematician and experimental meteorologist, Banerji had earlier worked with C.V. Raman and developed indigenous weather instruments during World War II, earning the Order of the British Empire (OBE). Though his project was self-funded and overlooked by authorities, it later inspired further research at the National Physical Laboratory.

Inspired by early U.S. experiments, Banerji developed a homemade glass cloud chamber and conducted outdoor trials from Jadavpur College of Engineering.



Source:Telegraph India

Without access to aircraft, he ingeniously used balloon-based dispersal systems filled with dry ice and gunpowder to release seeding material.His low-cost method produced heavy rainfall, astonishing local residents and earning recognition from the Council for Scientific and Industrial Research (CSIR) in 1955.

Today, the IMD honors his legacy with his photograph at its Delhi headquarters and a conference room in his name at the Alipore office. As modern India again explores cloud seeding for pollution and drought control, Dr. Banerji's 1952 achievement stands as a timeless reminder of innovation born of curiosity and perseverance—the legacy of India's first true rainmaker.

We are in pursuit of improvement and are keen to know your views.
Please write to us at ssb.newsletters@icmai.in

# COMING NEXT MONTH

## A New Series on Earth's Hidden Connections on
## Ecological Interdependence and Sustainability

In nature, everything is linked. What happens in one part of the world can affect places far away. Dust from the Sahara helps plants grow in the Amazon. Moisture from the Amazon brings rain to Africa. Melting ice in the Arctic changes weather everywhere. Oceans help produce the air we breathe, migrating birds enrich different lands, and even volcanoes create rich soil.

These examples show that sustainability is not just a local matter—it is a global responsibility. When we protect one ecosystem, the positive effects spread to many other places. But when we damage nature, the problems spread too, affecting food, climate, and people around the world.

These facts are well known, but we would like to share them in a simple way through our newsletter to remind everyone of their importance.


From next month, through this new series, we will explain how Earth's systems are wonderfully connected and why caring for our planet is essential for our shared future. We invite you to join us and help spread this awareness across our society.

# 5 Questions on sustainability

1. India's Central Electricity Authority has unveiled a plan to transmit _____GW of Hydro Power from the Brahmaputra basin by 2047.

2. Kerala's step into ESG-driven governance is as much a message to global markets as it is to _____.

3. _____ refers to an individual certified by Environment Audit Designated Agency (EADA) as qualified to undertake Environment Audits.

4. The UK government has introduced legislation recently bringing _____ under the supervision of the Financial Conduct Authority (FCA)

5. _____European airlines have agreed to overhaul their environmental marketing practices after EU consumer authorities found that many claims could mislead passengers about the climate impact of air travel.

**THERE ARE NO WINNERS FOR THE OCTOBER 2025 QUIZ.**

| CORRECT ANSWERS OF PREVIOUS QUIZ | |
|---|---|
| 1 | Natural Resource Augmentation Plan |
| 2 | 400000 |
| 3 | 500 GW |
| 4 | 8.1 million |
| 5 | Kerala |

The names of first 5 participants giving correct responses will be declared in the ensuing newsletter. The responses may be sent to ssb.newsletters@icmai.in

## Call for articles

*Sukhinobhavantu* is inviting articles on the theme ESG/ Sustainability or related themes for publishing in December'2025 edition. The articles should be relevant and original. The article should clearly cover/depict the scope, opportunity and potential for cost accountants. It should not exceed 2200 words and references/ sources are to be given wherever required. It should reach us latest by December 14, 2025, by email to ssb.newsletters@icmai.in The right for selection of articles vests with SSB. Decision of SSB will be final and binding.

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