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Avinash Kumar

Avinash Kumar has completed his Ph.D. in International Investment Law from the Dept. of Law & Governance, Central University of South Bihar. His research work is on "International Investment Agreement and State's right to regulate Foreign Investment." He qualified UGC-NET and has been selected for the prestigious ICSSR Doctoral Fellowship. He is an alumnus of the Faculty of Law, University of Delhi. Formerly he has been elected as Students Union President of Law Centre-1, University of Delhi. Moreover, he completed his LL.M. from the University of Delhi (2014-16), dissertation on "Cross-border Merger & Acquisition"; LL.B. from the University of Delhi (2011-14), and B.A. (Hons.) from Maharaja Agrasen College, University of Delhi. He has also obtained P.G. Diploma in IPR from the Indian Society of International Law, New Delhi. He has qualified UGC – NET examination and has been awarded ICSSR – Doctoral Fellowship. He has published six-plus articles and presented 9 plus papers in national and international seminars/conferences. He participated in several workshops on research methodology and teaching and learning.

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ENVIRONMENTAL EDUCATION AS A TOOL FOR ACCELERATING CLIMATE-RESPONSIVE BEHAVIOR: LINKING SDG 4, SDG 13, AND POLICY GAPS

AUTHORED BY - SEEMA RAHMAN

Abstract

Environmental education has the power to shape climate-conscious actions and ignite sustainable development. This paper examines education, governance, and the law, focusing on how environmental education can address the policy gaps between SDG 4 (Quality Education) and SDG 13 (Climate Action). Which analyzes international and domestic legal instruments, including India's Environmental Protection Act of 1986, the National Green Tribunal Act of 2010, and the UNFCCC and Paris Agreement. To assess the degree to which the laws on environmental protection in education and policy implementation frameworks are integrated, if at all.

These frameworks are in place, yet there is still a lacuna between the law's ambitions and what occurs in practice. In the developing world, climate change is often ignored as a serious, actionable issue, and education as a response to the climate crisis is virtually non-existent. This paper posits that environmental education needs to expand from raising general awareness to the promotion of environmental ethics and values that elicit change in sustainable behaviors.It compiles successful case studies from India and Costa Rica, as well as Scandinavian countries that integrate formal and informal education on climate literacy which foster resilience in communities.

The paper additionally focused the urgency of formulating plans that balance the economic growth of a region with its environmental protection. Through climate education coupled with vocational and livelihood program training, informed citizens emerge, enabling nations to drive low-carbon inclusive growth. The primary focus is on interdisciplinary collaboration, which is uniting educators with legal scholars, policymakers, scientists, and even Indigenous peoples to design equitable, culturally-rooted climate curricula and action plans.

The paper, as the last step, argues for the need to rethink environmental education as a

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policy instrument and a legal entitlement that could catalyze transformative action. It defends the case for embedding climate literacy in the education systems of the country, which, in primary education, is not a matter of wishful thinking, but a prerequisite to attain environmental justice, resilience, and a sustainable future for all.

Key words

Environmental Legal Frameworks, Sustainable Development and Education, Climate Awareness and Ecological Ethics & Interdisciplinary Climate Governance

I. INTRODUCTION

The accelerating pace of climate change has emerged as one of the most pressing challenges of the 21st century. Rising global temperatures, extreme weather events, sea level rise, and biodiversity loss are not abstract projections but lived realities that threaten human survival and ecological balance. Scientific consensus affirms that anthropogenic activities driven largely by unsustainable consumption and production patterns are the primary contributors to global warming and environmental degradation. [1] In this context, education assumes a pivotal role in shaping social attitudes and behaviors toward sustainable living. Environmental education, therefore, is not only an academic subject but a societal necessity, offering the intellectual and ethical foundation required for addressing climate change.

The United Nations' Sustainable Development Goals (SDGs) provide a comprehensive global framework for balancing economic development, social inclusion, and environmental sustainability. Within this framework, SDG 4 emphasizes inclusive, equitable, and quality education, while SDG 13 stresses urgent action to combat climate change and its impacts. The interlinkage between these two goals underscores the recognition that educational systems are essential vehicles for transforming climate awareness into climate-responsive behavior. Environmental education enables individuals to understand the scientific dimensions of climate change, recognize its socio-economic consequences, and adopt adaptive as well as mitigative strategies.[2]

In the Indian context, the imperative of environmental education gains further

[1] Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2021: The Physical Science Basis* (Cambridge University Press, 2021).
[2] United Nations, *Sustainable Development Goals Knowledge Platform*, 2015.

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significance. India is among the most climate-vulnerable nations, facing challenges such as heatwaves, irregular monsoons, floods, and desertification, which directly affect livelihoods, agriculture, health, and migration patterns. Recognizing this, the Constitution of India provides a normative framework for environmental protection. Article 21, as expansively interpreted by the judiciary, guarantees the right to a wholesome environment as part of the right to life. Article 48A directs the State to protect and improve the environment, while Article 51A(g) casts a fundamental duty upon citizens to protect natural resources.[3] These provisions collectively establish an enabling environment for integrating environmental education into governance and public life.

The Indian judiciary has been proactive in reinforcing the role of environmental education. In *M.C. Mehta v. Union of India*, the Supreme Court mandated the inclusion of environmental education in school curricula, recognizing its indispensability for fostering environmental consciousness among young citizens.[4] Similarly, in *T.N. Godavarman Thirumulpad v. Union of India*, the Court emphasized the importance of ecological balance and conservation, reinforcing the need for awareness-based interventions. These decisions illustrate that environmental education is not a matter of policy choice alone, but a constitutional and judicially recognized obligation.

At the global level, multiple international instruments underscore the role of education in climate action. The Rio Declaration (1992), Agenda 21, and the Paris Agreement (2015) stress the importance of public participation and educational initiatives in environmental protection. The UN Framework Convention on Climate Change (UNFCCC), particularly through Article 6, calls upon member states to promote public awareness, access to information, and participation in decision-making on climate issues. These frameworks position environmental education as a cornerstone of climate governance.[5]

Despite these constitutional, judicial, and international commitments, several policy gaps remain in India. The National Education Policy (NEP) 2020 makes a passing reference to sustainability and environmental awareness, but lacks a structured roadmap for climate-focused curricula across all levels of education. Similarly, initiatives like the National Action Plan on

[3] The Constitution of India, arts. 21, 48A, 51A(g).
[4] *M.C. Mehta v. Union of India,* (2004) 12 SCC 118.
[5] United Nations, *Rio Declaration on Environment and Development*, 1992; Paris Agreement, 2015, art. 12.

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Climate Change (NAPCC) and its state-level counterparts often remain technocratic, with limited focus on community-based awareness and participatory learning. The absence of institutionalized mechanisms for translating knowledge into behavior further weakens the transformative potential of environmental education.[6]

A comparative perspective also reveals that countries such as Finland, Sweden, and Costa Rica have successfully integrated environmental education into national curricula, linking theoretical knowledge with practical, community-driven climate action. These experiences highlight the necessity of embedding environmental literacy not only in classrooms but also in governance structures, workplaces, and civil society networks.[7] For India, where socio-economic disparities amplify climate vulnerabilities, environmental education has to be inclusive, addressing marginalized and vulnerable populations who often bear the brunt of ecological crises without adequate resources to adapt.

The introduction of this paper thus situates environmental education as both a right and a responsibility. It is a right, insofar as every individual is entitled to access knowledge that safeguards their health, livelihood, and dignity against environmental threats. Simultaneously, it is a responsibility, since informed citizens are better equipped to act as custodians of the environment and demand accountability from state and non-state actors. The linkage between SDG 4 and SDG 13 provides the analytical framework through which this paper examines how environmental education can accelerate climate-responsive behavior. By critically assessing constitutional mandates, international obligations, judicial interventions, and policy shortcomings, this study seeks to demonstrate that education is the most powerful instrument for achieving climate justice and intergenerational equity.

II. THE ROLE OF ENVIRONMENTAL EDUCATION IN ACHIEVING SDG 4 AND SDG 13

The Sustainable Development Goals (SDGs) adopted under the United Nations 2030 Agenda for Sustainable Development highlight education as both a standalone goal and a cross-cutting enabler for achieving all other global objectives. In particular, SDG 4 emphasizes *quality education*, while SDG 13 calls for *urgent action to combat climate change and its impacts*.

[6] Government of India, *National Education Policy 2020*, Ministry of Human Resource Development.
[7] UNESCO, *Education for Sustainable Development: A Roadmap*, 2020.

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Environmental education emerges as the intersection of these two goals, serving not only as a pedagogical tool but also as a catalyst for transforming individual behavior, community practices, and policy-level decisions. The conceptualization of environmental education as a human right and developmental necessity marks a critical shift from its earlier perception as an ancillary subject in curricula to being a key component of sustainable futures[8].

Environmental Education under SDG 4 (Quality Education)

SDG 4 aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all." Within this goal, Target 4.7 explicitly underscores the role of education in promoting sustainable development by ensuring that learners acquire knowledge and skills needed to promote sustainable lifestyles, global citizenship, and appreciation of cultural diversity[9]. This reflects a paradigm shift in education where learning transcends technical literacy and embraces values, ethics, and action-oriented competencies.

Environmental education contributes to SDG 4 by reshaping curricula at all levels from primary schools to universities toward sustainability learning. For instance, UNESCO's Global Action Programme on Education for Sustainable Development integrates climate change modules into formal and non-formal education systems[10]. In India, the University Grants Commission (UGC) made it mandatory for undergraduate students to study a foundation course on environmental studies, thereby institutionalizing sustainability learning[11].

The inclusion of environmental education under SDG 4 thus creates a ripple effect: it builds informed citizenries, prepares skilled professionals for green jobs, and equips communities with the ability to adapt to and mitigate climate change impacts. Beyond classroom teaching, it embeds environmental consciousness into lifelong learning, ensuring that education leads to transformative action.

Environmental Education under SDG 13 (Climate Action)

SDG 13 emphasizes "urgent action to combat climate change and its impacts." It includes

[8] United Nations, *Transforming Our World: The 2030 Agenda for Sustainable Development*, UN Doc. A/RES/70/1 (2015).
[9] Ibid. Goal 4, Target 4.7.
[10] UNESCO, *Global Action Programme on Education for Sustainable Development* (2014).
[11] University Grants Commission (UGC), *UGC Circular on Environmental Studies as a Compulsory Subject for Undergraduate Courses* (2003).

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Target 13.3, which specifically aims to "improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning."[12] This recognition reinforces the understanding that climate action cannot be achieved merely through technological or legal measures but requires attitudinal and behavioral transformation at all levels of society.

Environmental education plays a dual role here: first, by raising awareness about the scientific dimensions of climate change, and second, by fostering climate-responsive behaviors such as sustainable consumption, energy efficiency, waste reduction, and ecosystem conservation. In the Indian context, initiatives such as the *National Action Plan on Climate Change (NAPCC)* and its State-level counterparts highlight the integration of educational and awareness components into climate strategies[13]. Furthermore, India's *National Education Policy (2020)* acknowledges the urgency of climate literacy and proposes curricula reforms that embed climate concerns within multidisciplinary frameworks[14].

In practical terms, environmental education contributes directly to climate resilience by equipping local communities with adaptive knowledge. For instance, coastal communities in Maharashtra have benefited from awareness programs that teach disaster preparedness, sustainable fishing practices, and mangrove conservation, thereby linking education with immediate climate survival strategies[15].

Intersection of SDG 4 and SDG 13 through Environmental Education

While SDG 4 focuses on the right to education and SDG 13 emphasizes climate action, their intersection through environmental education creates a mutually reinforcing framework. Education empowers individuals with the skills to understand climate science, while climate challenges make the integration of environmental education into curricula non-negotiable.

The *interdependency* between these two goals becomes evident in how youth-led climate movements globally such as *Fridays for Future*, draw legitimacy from scientific and

[12] Supra note 1, Goal 13, Target 13.3.
[13] Government of India, *National Action Plan on Climate Change* (NAPCC), Prime Minister's Council on Climate Change (2008).
[14] Ministry of Education, *National Education Policy, 2020* (New Delhi: Government of India, 2020).
[15] Centre for Science and Environment (CSE), *Climate Resilience in Coastal Communities of Maharashtra* (2019).

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environmental education[16]. Similarly, Indian student-led campaigns in states like Kerala, where environmental education is robustly integrated into schools, demonstrate how awareness translates into community-based climate resilience[17].

This integration also strengthens democratic participation. An educated citizenry, equipped with environmental knowledge, is more likely to demand accountability from governments, corporations, and international organizations. Hence, environmental education serves as a democratic tool for ensuring climate justice and intergenerational equity.

Behavioral Transformation and Climate-Responsive Citizenship

One of the central contributions of environmental education lies in its ability to transform attitudes and behaviors. Knowledge alone is insufficient to tackle the climate crisis; it is the translation of knowledge into practice that ensures meaningful impact. Studies show that children exposed to environmental education programs often influence household practices, such as water conservation and waste segregation, thus demonstrating education's multiplier effect[18].

In urban contexts like Mumbai, environmental education fosters climate-responsive behavior by encouraging use of public transport, promoting waste segregation at source, and raising awareness about urban flooding and heatwaves. Here, local NGOs like the *Centre for Environmental Research and Education (CERE)* play a vital role in linking classroom knowledge with community action[19]. Thus, environmental education not only enables personal change but also builds collective climate resilience.

The role of environmental education in linking SDG 4 and SDG 13 is both profound and indispensable. It bridges the gap between knowledge and action, between human rights and climate justice, and between individual behavior and global sustainability. While international frameworks provide normative guidance, national and local initiatives contextualize this learning to ensure climate-responsive citizenship. The integration of

[16] Fridays for Future, *Youth Climate Movement Manifesto* (2019).
[17] Kerala State Council of Educational Research and Training (SCERT), *Environmental Education in Kerala: A Model for India* (2018).
[18] Louise Chawla & Derek Flanders, "Children as Catalysts of Environmental Change" *Journal of Environmental Education* Vol. 31, No. 1 (2000).
[19] Centre for Environmental Research and Education (CERE), *Annual Report 2021*.

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environmental education into formal, non-formal, and community-based learning systems is therefore not optional but essential for achieving the transformative vision of the 2030 Agenda.

III. LINKING ENVIRONMENTAL EDUCATION WITH CLIMATE-RESPONSIVE BEHAVIOUR

Environmental education (EE) has long been recognized as a transformative force that bridges the gap between abstract knowledge of environmental issues and the practical behavioral changes required to mitigate them. In the context of climate change, this linkage is particularly crucial. Climate change is not merely a scientific or technological issue; it is fundamentally a behavioral and social challenge. As the Intergovernmental Panel on Climate Change (IPCC) has repeatedly emphasized, achieving emission reduction targets and adapting to climatic risks requires significant changes in consumption patterns, energy use, waste management, and collective decision-making.[20] Environmental education, therefore, serves as the primary vehicle to instill climate-responsive behavior by cultivating awareness, attitudes, skills, and values that translate into sustainable practices at both individual and community levels.

The conceptual underpinning of this linkage is rooted in the theory of environmental literacy. Environmental literacy goes beyond mere ecological knowledge; it emphasizes the development of critical thinking, problem-solving abilities, and an ethical orientation towards nature. Scholars like Hungerford and Volk argue that environmental literacy progresses through multiple stages from awareness and knowledge to attitudes, skills, and ultimately action.[21] This theoretical trajectory resonates strongly with climate action because climate change mitigation and adaptation require a similar progression: one must first understand the problem, then develop attitudes supportive of solutions, acquire the skills necessary for change, and finally engage in sustained action.

A major feature of EE's contribution to climate-responsive behavior is the promotion of pro-environmental attitudes. Studies in psychology demonstrate that awareness alone is insufficient to trigger behavioral change; what matters is the internalization of values such as ecological responsibility, intergenerational justice, and stewardship of natural resources.[22]

[20] IPCC, *AR6 Synthesis Report: Climate Change 2023* (Intergovernmental Panel on Climate Change, 2023).
[21] Hungerford, H. & Volk, T., *Changing Learner Behavior Through Environmental Education* (1980) 21 Journal of Environmental Education 8.
[22] Schultz, P. W., *The Structure of Environmental Concern* (2001) 56 Journal of Environmental Psychology 327.

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Environmental education, particularly when delivered through experiential and participatory methods, helps learners connect emotionally and ethically with the climate crisis. For instance, school programs that integrate climate simulations, tree-planting drives, or carbon footprint assessments instill in students not only knowledge but also a sense of personal accountability. These micro-level transformations have macro-level implications, as they influence voting behavior, policy preferences, and civic engagement in climate issues.

Another dimension is skills development. Climate change is a multifaceted crisis that requires adaptive and innovative solutions ranging from renewable energy transitions to community-level disaster preparedness. Environmental education equips individuals with the technical and social skills needed to engage in such solutions. For example, vocational training in solar panel installation, rainwater harvesting, or urban gardening can directly contribute to sustainable livelihoods while also fostering resilience to climate impacts.[23] Similarly, digital literacy combined with environmental education enables young people to leverage technology for climate advocacy, data collection, and sustainable entrepreneurship. Thus, EE is not limited to abstract moral appeals but generates tangible skills that empower climate-responsive behavior.

Importantly, the linkage between EE and climate action must be understood within the framework of social justice and inclusivity. In developing countries such as India, marginalized communities often bear the disproportionate burden of climate change facing risks such as flooding, droughts, crop failures, and health crises while contributing the least to emissions. Here, environmental education serves a dual purpose: it sensitizes privileged populations to the ethical dimension of climate justice, and it empowers vulnerable communities with adaptive knowledge and resilience-building skills.[24] For instance, community-based education programs in rural areas have trained farmers on climate-resilient agriculture techniques, thereby enhancing food security and reducing vulnerability. Such initiatives illustrate that EE is not just about conserving nature but also about ensuring equitable adaptation and resilience in the face of global climate risks.

At the policy level, the role of EE in shaping climate-responsive behavior has been

[23] Tilbury, D., *Environmental Education for Sustainability: Defining the New Focus of Environmental Education in the 1990s* (1995) 36 Environmental Education Research 195.
[24] Agarwal, A. & Narain, S., *Global Warming in an Unequal World* (Centre for Science and Environment, 1991).

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codified in several international frameworks. Article 6 of the United Nations Framework Convention on Climate Change (UNFCCC) explicitly recognizes education as a key tool for climate action, calling on member states to develop programs that enhance awareness and participation.[25] Similarly, Article 12 of the Paris Agreement reaffirms the importance of education, training, and public participation in climate change mitigation and adaptation. These provisions establish a clear normative link between EE and climate action, creating obligations for states to integrate environmental education into their climate policies. National governments have responded in varying degrees: India's National Action Plan on Climate Change (NAPCC) highlights awareness and capacity-building as cross-cutting themes across its eight national missions, while the National Education Policy (2020) envisions sustainability as a guiding principle in curricular design.[26]

The linkage is further strengthened through local and grassroots initiatives. For example, the *Eco-Schools Programme run* by the Foundation for Environmental Education has demonstrated that students exposed to sustainability projects in schools are more likely to practice waste segregation, water conservation, and energy efficiency at home.[27] Similarly, India's *National Green Corps* has mobilized millions of students through eco-clubs, directly linking classroom knowledge with community action. These examples underscore the central thesis: environmental education is most effective in producing climate-responsive behavior when it moves beyond textbooks into lived practice.

However, this linkage is not without challenges. Critics argue that many environmental education programs remain overly theoretical, focusing on abstract knowledge without equipping learners with actionable skills. There is also the risk of "greenwashing" in education, where programs promote superficial eco-friendly actions (like symbolic recycling drives) without addressing systemic changes needed for climate mitigation.[28] Moreover, unequal access to quality education further exacerbates climate injustice, as rural and marginalized populations are often left out of formal EE initiatives. This highlights the need for integrated approaches that combine formal, non-formal, and informal education across diverse socio-

[25] United Nations, *UNFCCC, Article 6: Education, Training and Public Awareness* (1992).
[26] Government of India, *National Action Plan on Climate Change* (2008); Ministry of Education, *National Education Policy* (2020).
[27] Foundation for Environmental Education, *Eco-Schools Programme Report* (2019).
[28] Stevenson, R. B., *Schooling and Environmental Education: Contradictions in Purpose and Practice* (2007) 13 Environmental Education Research 139.

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economic contexts.

To strengthen the linkage between EE and climate-responsive behavior, scholars and policymakers advocate for transformative pedagogy. This involves approaches such as problem-based learning, intergenerational learning, and community partnerships that place learners in active roles as change agents. For example, projects where students collaborate with local authorities to design waste management systems or conduct energy audits instill a deeper sense of agency and responsibility. Such pedagogical innovations ensure that climate education does not merely inform but transforms creating citizens who are both knowledgeable and motivated to act.

Therefore environmental education serves as the linchpin in cultivating climate-responsive behavior. By shaping attitudes, building skills, fostering ethical responsibility, and empowering communities, EE bridges the gap between awareness and action. International agreements, national policies, and grassroots initiatives all recognize this vital linkage. Nevertheless, the challenge lies in ensuring that EE programs are inclusive, practical, and transformative rather than symbolic. Only then can environmental education fulfill its potential as the foundation for a climate-resilient future.

IV. POLICY GAPS IN ENVIRONMENTAL EDUCATION FOR CLIMATE-RESPONSIVE BEHAVIOR

Environmental education has emerged as a cornerstone for advancing the twin goals of Sustainable Development Goal 4 (Quality Education) and Sustainable Development Goal 13 (Climate Action). While international frameworks and national policies increasingly recognize the importance of integrating environmental literacy into mainstream education, there remains a persistent gap between policy formulation and ground-level implementation. These gaps manifest in diverse forms: inadequate curriculum design, lack of teacher training, weak enforcement of policy mandates, and absence of measurable learning outcomes. In India, despite constitutional mandates under Articles 21, 48A, and 51A(g) of the Constitution, as well as judicial pronouncements affirming the right to a clean environment as part of the right to life, implementation remains fragmented. This section critically examines these policy gaps by situating them within international commitments, Indian legal-constitutional mandates, and regional disparities in implementation.

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Constitutional and Judicial Mandates vs. Policy Translation

The Indian judiciary has repeatedly underscored the necessity of environmental education. In *M.C. Mehta v. Union of India (2004),* the Supreme Court directed the compulsory introduction of environmental education at all levels of schooling.[29] Despite this directive, subsequent reviews have revealed that many state education boards have either introduced minimal tokenistic modules or integrated environmental topics without a clear pedagogical framework. The absence of a monitoring mechanism has meant that judicial directions remain inadequately enforced.

Furthermore, while the National Education Policy (NEP) 2020 emphasizes holistic and multidisciplinary approaches to learning, its provisions on climate-responsive education remain aspirational rather than operational. The policy refers to the importance of "education for sustainable development" but does not create binding curriculum obligations on states or institutions. This results in asymmetry between central policy aspirations and localized curriculum design.

Fragmented Institutional Responsibility

One of the most significant policy gaps is the fragmentation of institutional authority. Environmental education falls at the intersection of multiple ministries: the Ministry of Education, the Ministry of Environment, Forest and Climate Change (MoEFCC), and various state departments. However, there is no single nodal body to coordinate implementation, resulting in overlapping responsibilities and diluted accountability.[30]

The National Green Tribunal (NGT) has, in several orders, observed that environmental literacy must be integrated into governance structures, yet the lack of coordination means that environmental education remains a peripheral policy priority. Even flagship programs like the National Action Plan on Climate Change (NAPCC) or State Action Plans on Climate Change (SAPCCs) do not adequately mainstream education as a critical axis of climate response.

Inadequate Curriculum Design and Pedagogy

Most existing environmental curricula in India focus on descriptive knowledge: definitions of pollution, biodiversity, or climate change without enabling behavioral change or critical thinking. Internationally, UNESCO has emphasized Education for Sustainable Development (ESD) as a transformative tool that combines knowledge with skills, values, and action-

[29] *Ibid*
[30] *National Green Tribunal Bar Association v. Union of India*, (2013) SCC Online NGT 12.

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oriented learning.[31] In contrast, Indian curricula often lack experiential learning components such as fieldwork, community engagement, and participatory projects.

The absence of standardized evaluation tools also creates inconsistency. While CBSE has attempted to integrate environmental education as a cross-cutting theme, state boards exhibit uneven adoption. Rural schools, in particular, face challenges due to lack of resources, trained teachers, and access to digital content, thereby perpetuating inequality in climate literacy.

Teacher Training and Capacity Gaps

Teachers are the most critical link in delivering environmental education, yet teacher training remains one of the weakest areas. Studies indicate that many teachers lack adequate subject knowledge on climate change and sustainability issues, and professional development programs on environmental pedagogy are scarce.[32] This creates a disconnect: even when curricula are updated, teachers may not have the tools to translate content into meaningful classroom practices.

The Right of Children to Free and Compulsory Education Act, 2009 (RTE Act) ensures access to schooling but does not explicitly mandate environmental pedagogy as part of minimum learning outcomes. Thus, while access has expanded, the quality dimension particularly in climate literacy remains underdeveloped.

Urban-Rural and Private-Public Disparities

Another policy gap is the stark disparity across geographies and school types. Elite urban schools, often affiliated with international boards such as IB or Cambridge, incorporate climate literacy, sustainability projects, and green campuses as part of their core pedagogy. In contrast, rural government schools often struggle with basic infrastructure such as classrooms, electricity, or clean drinking water, leaving little scope for climate-responsive curricula.[33]

This disparity not only creates unequal access to climate literacy but also perpetuates social inequality: those most vulnerable to climate risks marginalized rural populations are least equipped with the knowledge to respond.

[31] UNESCO, *Education for Sustainable Development: A Roadmap* (2020).
[32] Tilbury, D., "Environmental Education for Sustainability: Defining the New Focus of Environmental Education in the 1990s," *Environmental Education Research*, 1995.
[33] Agarwal, A. & Narain, S., *Global Warming in an Unequal World* (Centre for Science and Environment, 1991).

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International Policy Commitments and Domestic Shortfalls

India is a signatory to several international frameworks including the Paris Agreement (2015), the 2030 Agenda for Sustainable Development, and the UN Framework Convention on Climate Change (UNFCCC), all of which underscore the role of education in addressing climate change.[34] Yet, India's Voluntary National Reviews (VNRs) submitted to the UN High-Level Political Forum reveal that progress in SDG 4.7 (education for sustainable development) is slow and uneven.

The challenge lies in translating international commitments into domestic educational reform. Unlike countries such as Finland or Costa Rica, where climate literacy is mainstreamed across subjects, India has yet to create binding mandates and evaluation frameworks for environmental education.

Absence of Monitoring and Evaluation Frameworks

Even where environmental education is mandated, there is little systematic monitoring to assess whether students acquire the intended competencies. National surveys like NAS (National Achievement Survey) and international ones like PISA seldom evaluate environmental or climate literacy. This creates a data gap, making it difficult to measure policy effectiveness. Without indicators such as climate knowledge scores, behavioral changes, or sustainability practices at the school level, environmental education risks remaining a symbolic policy gesture rather than a substantive driver of change.[35]

Policy Gaps in Higher Education and Research

While much focus is placed on school curricula, higher education also exhibits policy voids. University-level courses in environmental law, climate science, or sustainable development are concentrated in elite institutions, leaving vast segments of students without specialized exposure. Moreover, research funding in climate education remains minimal, and interdisciplinary approaches combining law, science, and social studies are rare. The UGC Environmental Studies course (compulsory for undergraduates), introduced pursuant to the Supreme Court's direction in M.C. Mehta has often been criticized for being tokenistic and exam-oriented rather than fostering meaningful engagement.

[34] UNFCCC, *Paris Agreement* (2015).
[35] National Achievement Survey Report, NCERT, 2021.

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Linking Policy Gaps to SDG 4 and SDG 13

The absence of integrated and enforceable environmental education policies undermines both SDG 4.7 (which calls for learners to acquire knowledge and skills for sustainable development) and SDG 13.3 (which urges countries to improve education, awareness, and institutional capacity on climate change adaptation and mitigation). Unless these gaps are addressed, India risks lagging in its international commitments, while also failing to equip its citizens with the competencies needed for a climate-vulnerable future.

The policy gaps in environmental education reflect a disconnect between constitutional mandates, judicial directions, international commitments, and ground realities. Without clear institutional accountability, curriculum innovation, teacher capacity-building, monitoring frameworks, and equitable access, environmental education will remain peripheral to India's climate strategy. Bridging these gaps requires not only legislative reform but also a paradigm shift: moving from tokenistic content to transformative pedagogy that empowers citizens to act as climate-conscious agents of change.

V. POLICY GAPS AND THE WAY FORWARD

Persistent Policy Gaps in Environmental Education

Despite the international recognition of environmental education as a cornerstone for sustainable development, significant policy gaps remain at both global and national levels. Firstly, there exists a lack of uniform integration of environmental education into school curricula across countries. While SDG 4 explicitly mandates the inclusion of education for sustainable development and global citizenship, only a few countries such as Finland, Sweden, and Costa Rica have fully embedded it into their national education strategies[36]. In contrast, many developing nations, including India, face fragmented implementation, with environmental topics often relegated to extracurricular activities rather than being systematically mainstreamed into pedagogy[37].

Secondly, there is a gap between policy rhetoric and ground-level practice. For instance, although India's National Education Policy (NEP) 2020 recognizes environmental awareness as a key learning objective, in reality, environmental subjects are treated as optional modules without sufficient assessment mechanisms[38]. Without making environmental education examinable, the motivation for both students and teachers to engage deeply remains low. This

[36] UNESCO, *Education for Sustainable Development Goals: Learning Objectives* (2017).
[37] Ministry of Human Resource Development, *National Curriculum Framework* (2005).
[38] Ministry of Education, *National Education Policy 2020* (New Delhi: Government of India, 2020).

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undermines the transformative potential of education in shaping climate-responsive behavior.

A third gap is inadequate teacher preparedness. Teachers often lack the necessary training, resources, and capacity to translate abstract concepts of climate change into relatable classroom discussions[39]. This results in environmental education being limited to textbook recitations rather than experiential and problem-solving learning approaches. A UNESCO survey revealed that less than 40% of teachers worldwide feel equipped to teach climate change effectively[40]. The lack of investment in capacity building directly affects the quality and impact of environmental literacy.

Another critical gap lies in the absence of localized and contextualized curriculum. Environmental issues are inherently local ranging from urban air pollution in Mumbai to desertification in Rajasthan or glacier retreat in the Himalayas. However, most school curricula rely on generic global narratives of climate change, failing to equip students with the tools to address the immediate ecological challenges in their communities[41]. This disconnection between global discourse and local realities hampers effective behavioral change.

Finally, there is a policy disconnect between education and action. While schools may include environmental education in syllabi, there are limited opportunities for students to apply their knowledge in community-level projects or decision-making platforms[42]. Without institutional mechanisms for participation, young people remain passive learners instead of active contributors to climate governance.

Linking Policy Gaps to SDGs

The policy gaps in environmental education directly undermine the achievement of SDG 4 (Quality Education) and SDG 13 (Climate Action). Specifically:

- **SDG 4.7**, which calls for ensuring that learners acquire knowledge and skills needed to promote sustainable development, is weakened when environmental education is fragmented, optional, or not assessed[43].
- **SDG 13.3**, which mandates improving education and awareness for climate mitigation and adaptation, is compromised due to the lack of teacher training, poor curriculum design, and insufficient institutional support[44].

[39] UNESCO, *Teachers' Preparedness for Climate Education Report* (2021).
[40] Ibid.
[41] Ibid.
[42] United Nations Development Programme, *Youth and Climate Engagement Report* (2020).
[43] UN General Assembly, *Transforming Our World: The 2030 Agenda for Sustainable Development* (2015).
[44] Ibid.

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Moreover, these gaps perpetuate inter-generational inequity. The present generation of learners, if not adequately trained, will inherit the burden of dealing with intensified climate crises without the requisite knowledge or skills. This failure represents not only a breach of policy but also a violation of the right to education and right to a healthy environment, which are increasingly recognized as interdependent human rights[45].

COMPARATIVE PERSPECTIVES

Finland

Finland has embedded climate education into cross-curricular modules, ensuring that every subject from mathematics to arts addresses aspects of sustainability. Teachers undergo mandatory training, and schools adopt participatory projects like energy audits and climate strikes. India could replicate such interdisciplinary and experiential models[46].

Costa Rica

Costa Rica, known for its green policies, has made environmental stewardship part of its national identity. Education policies integrate outdoor learning, and environmental protection is promoted as a civic duty. The synergy between education and national policy is a key lesson for India[47].

Bangladesh (SAARC Perspective)

As a fellow climate-vulnerable nation, Bangladesh has introduced climate education in primary school textbooks and community-based adaptation training for coastal populations. This shows how contextualized, local approaches can complement formal education. India can learn from these grassroots models, especially for vulnerable regions like Sundarbans[48].

The Way Forward: Strengthening Policy Frameworks

To bridge the existing gaps, a multi-dimensional approach is required, involving curricular reforms, institutional capacity building, community participation, and stronger international cooperation.

[45] Knox, J.H., *Report of the Special Rapporteur on Human Rights and the Environment* (UNHRC, 2018).
[46] Finnish Ministry of Education, *National Core Curriculum for Basic Education* (2016).
[47] OECD, *Costa Rica Environmental Performance Review* (2020).
[48] Bangladesh Ministry of Education, *Climate Change Curriculum Framework* (2018).

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(a) Curriculum Reforms

Governments must ensure that environmental education is compulsory, examinable, and interdisciplinary. Rather than being confined to environmental science as a single subject, climate education should be integrated into history (linking industrial revolutions to carbon emissions), economics (understanding green jobs), civics (citizens' role in climate governance), and even literature (reflecting ecological themes in narratives)[49]. Embedding sustainability across subjects encourages holistic understanding and avoids compartmentalization.

(b) Teacher Training and Pedagogical Innovation

A critical step is massive investment in teacher training. This includes providing educators with access to digital tools, climate data, and innovative pedagogical methods such as simulations, role-play, and experiential projects[50]. For example, Finland has successfully implemented cross-disciplinary teaching modules where climate change is taught through practical, real-life projects, encouraging students to design solutions for local sustainability challenges[51]. India and other developing countries can adapt similar models through regional training institutes.

(c) Localized Curriculum Development

Curricula should be context-sensitive, reflecting the ecological realities of specific regions. In Mumbai, for instance, lessons could focus on urban air pollution, waste management, and coastal flooding. In rural Rajasthan, desertification and water scarcity should form the basis of environmental modules[52]. By linking education to local contexts, students can relate more deeply and develop problem-solving skills tailored to their communities.

(d) Community and Experiential Learning

Education policy must move beyond classrooms to embrace community engagement projects. Students should be encouraged to participate in local clean-up drives, biodiversity mapping, tree plantation campaigns, and renewable energy experiments[53]. Schools and colleges can partner with local municipalities and NGOs to provide platforms for students to apply their learning in real-world contexts. Such participatory models not only deepen environmental understanding but also create active citizenship.

(e) Institutionalizing Youth Participation in Policy

One of the most significant reforms would be to institutionalize the role of youth in climate

[49] Orr, D., *Earth in Mind: On Education, Environment, and the Human Prospect* (1994).
[50] UNESCO, *Teachers' Preparedness for Climate Education Report* (2021).
[51] Ibid.
[52] Centre for Science and Environment (CSE), *State of India's Environment Report* (2022).
[53] UNDP, *Youth and Climate Engagement Report* (2020).

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governance. Governments can create student councils on sustainability, ensure youth representation in municipal climate committees, and integrate student-led innovations into policy frameworks[54]. This gives young people a sense of ownership and empowers them to act as agents of change.

(f) Funding and International Cooperation

Environmental education requires sustained financial investment. International platforms such as the Green Climate Fund could earmark resources specifically for building educational infrastructure, teacher training, and curriculum design[55]. South-South cooperation, particularly among SAARC countries, could also facilitate the sharing of best practices in climate education.

Reconceptualizing Environmental Education as a Right

Ultimately, environmental education should not be viewed merely as a policy choice but as a human right. The linkage between education and the environment is now firmly recognized in global discourse, with the UN General Assembly in 2022 affirming the right to a clean, healthy, and sustainable environment as a universal human right[56]. Integrating environmental education into national constitutions and statutory frameworks ensures that governments can be held accountable for failing to provide adequate environmental literacy.

In India, this could mean expanding the scope of Article 21 (Right to Life) and Article 51A(g) (Fundamental Duty to protect the environment) to explicitly include the right to environmental education as an enforceable entitlement[57]. Judicial interpretations, particularly by the Supreme Court, have already recognized environmental protection as intrinsic to Article 21. Building on this jurisprudence, environmental education can be solidified as a constitutional guarantee, thereby closing the accountability gap.

Addressing policy gaps in environmental education is essential for achieving both SDG 4 and SDG 13. Without systemic reforms, environmental education risks remaining symbolic rather than transformative. The way forward lies in making curricula compulsory and examinable, training teachers, contextualizing content, engaging communities, ensuring youth participation, and guaranteeing legal entitlements. Only then can environmental education serve as a true tool for accelerating climate-responsive behavior and securing intergenerational

[54] Ibid.
[55] Green Climate Fund, *Strategic Plan 2020–2023* (GCF, 2020).
[56] UN General Assembly Resolution 76/300, *The Human Right to a Clean, Healthy and Sustainable Environment*(2022).
[57] *M.C. Mehta v. Union of India*, AIR 1987 SC 1086.

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justice.

VI. CONCLUSION

The relationship between environmental education and climate-responsive behavior is neither incidental nor rhetorical; it is intrinsic and indispensable. As established through the preceding sections, environmental education plays a dual role: it not only empowers individuals with knowledge but also cultivates sustainable attitudes and practices that respond directly to the pressing challenges of climate change. The United Nations' Sustainable Development Goals (SDGs) provide a global framework within which this relationship is concretized SDG 4 (Quality Education) and SDG 13 (Climate Action) converge to emphasize education as the foundational tool for cultivating a climate-conscious global citizenry.[58]

However, the translation of these global aspirations into local realities remains uneven. While India has demonstrated policy-level recognition of environmental education through initiatives such as the National Education Policy (2020), the Environmental Protection Act (1986), and the incorporation of environmental content in school curricula the implementation gaps are stark. A significant disconnect exists between the policy framework and its grassroots application. Environmental education, in many cases, remains theoretical, exam-oriented, and insufficiently participatory, limiting its potential to bring about behavioral change.[59]

A critical observation is that climate-responsive behavior cannot be cultivated solely through cognitive awareness. Behavioral science demonstrates that change occurs when knowledge is combined with values, motivation, and enabling socio-political conditions. Thus, education for climate action must go beyond imparting facts about global warming, greenhouse gases, or biodiversity; it must include practical skill-building, experiential learning, and opportunities for civic engagement.[60] For example, community-led waste management, tree plantation drives, water conservation campaigns, and renewable energy workshops can transform abstract concepts into lived practices, thereby closing the gap between knowledge and action.

The conclusion also underscores that equity and inclusivity are central to environmental

[58] United Nations, *Transforming our World: The 2030 Agenda for Sustainable Development* (2015), UNGA Res 70/1.
[59] Ministry of Education, *National Education Policy* (2020), Government of India.
[60] Ibid.

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education. The communities most vulnerable to climate change such as indigenous peoples, rural populations, coastal dwellers, and urban poor are often those with the least access to quality environmental education.[61] If SDG 4 is to serve as a true enabler of SDG 13, then environmental education must be context-sensitive, culturally rooted, and accessible to marginalized groups. This requires decentralized curriculum design, local language teaching, and collaboration with grassroots movements. Without addressing these equity concerns, environmental education risks becoming another elitist discourse that fails to resonate with those most affected.

Another layer of complexity is the role of technology and digital platforms. Digital education initiatives can democratize access to environmental learning, yet they also risk deepening the digital divide in countries like India. Thus, policy frameworks must strike a balance between leveraging technology for climate education while ensuring offline, community-based learning methods remain robust.[62] This dual approach can expand outreach without exacerbating inequalities.

From a legal and governance perspective, environmental education should not remain a peripheral obligation but should be recognized as a fundamental right linked to the constitutional right to life under Article 21 of the Indian Constitution. Judicial precedents, such as *MC Mehta v. Union of India*, have already underscored the constitutional duty of the State to ensure environmental awareness through education.[63] These judicial pronouncements must be operationalized through binding regulations, dedicated budgetary allocations, and robust monitoring mechanisms.

Finally, the future trajectory of environmental education as a tool for climate-responsive behavior must be multi-dimensional. Policymakers must integrate:

1. **Curriculum Reforms** – shifting from rote-learning to experiential and problem-solving pedagogy.
2. **Teacher Training** – empowering educators with updated skills and resources for climate literacy.

[61] Agarwal, Anil and Narain, Sunita, *Global Warming in an Unequal World: A Case of Environmental Colonialism*(1991), Centre for Science and Environment.
[62] Sharma, Ruchika, *Digital Divide and Educational Inequalities in India*, 12 Journal of Education Policy Studies (2021).
[63] *Ibid.*

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3. **Cross-Sectoral Collaboration** – involving NGOs, civil society, and private institutions in environmental education initiatives.
4. **International Cooperation** – aligning domestic policies with global best practices under the Paris Agreement and the UN SDG framework.
5. **Monitoring and Accountability** – establishing measurable indicators to track progress in both educational outcomes and climate action behavior.[64]

In sum, environmental education is not merely an academic exercise but a strategic intervention in the fight against climate change. It shapes citizens who are informed, responsible, and proactive in protecting the environment, thereby advancing not only SDG 4 and SDG 13 but also the holistic vision of sustainable development. The challenge ahead lies in transforming environmental education from a policy promise into a socially embedded, legally enforceable, and universally accessible reality. Only then can it serve as a true pathway to accelerating climate-responsive behavior and ensuring that the global pursuit of sustainability does not remain an unfulfilled aspiration.

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