






GREEN EDUCATION: THE FUTURE FOR SUSTAINABILITY IN 21ST CENTURY INDIA

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RESEARCH ARTICLE



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Abstract

The concept of sustainability has gained significant prominence in India during the 21st century, particularly due to issues such as climate change, pollution, and the exhaustion of natural resources. Green education has become an important way to address these problems by fostering environmental awareness, knowledge, and sustainable practices in schools and colleges. Based on the literature review, the paper explores the area of green education, how it can be integrated into the Indian education system, and what key initiatives are being taken by the government. This paper examines how various green education programs, such as government policies, school-based programs, and university-level interventions, can help students become more environmentally aware. It shows how initiatives such as eco-clubs and making environmental studies a required subject can strengthen environmental awareness, and green campus practices are helping students learn in a hands-on way and encouraging them to foster responsible attitudes and promote sustainable practices among them. The study also highlights how the National Education Policy 2020 can make sustainability education stronger by using hands-on and cross-disciplinary methods. The paper concludes that strengthening green education through innovation, policy support, and community engagement is essential for building a sustainable and resilient future for the country.

Keywords: *Green Education, Environmental Awareness, Sustainability, NEP 2020*

Introduction

The 21st century has caused many environmental problems that have never been seen before, such as climate change, loss of biodiversity, resource depletion, and pollution. In this situation, sustainability has become more than just a global priority; it is now a need for human survival and fair growth. Green education for sustainable development is essential to fostering a future in which environmental conservation and human welfare coexist harmoniously. The notion of green education emphasises the cultivation of awareness, the enhancement of knowledge, and the development of skills that enable individuals to engage actively in environmental conservation and sustainable practices (UNESCO, 2024). Most people agree that green education is very important for breaking the cycle of poverty across generations, improving health, and protecting the environment so that it can support current and future generations (Grosbeck et al., 2019). The most important event was the Earth Summit in Brazil in 1992, where Agenda 21 recognised Education for Sustainable Development (ESD) as a way to balance economic and human well-being through education. India has actively included green education into its national curriculum, acknowledging that sustainability encompasses environmental, social, cultural, and economic dimensions. Green education promotes the implementation of sustainable practices, including waste management, water conservation, and energy efficiency, while also cultivating the ideals of biodiversity protection and environmental care. India's national initiatives, including the National Green Corps (NGC) and the Green School Programme, have been instrumental in integrating sustainability into the educational framework and motivating students to become environmental activists and change people in their communities (Ministry of Environment, Forest and Climate Change, 2020-2021).

This paper talks about green education, its importance for achieving sustainability, and examines how green education programs are evolving in India in the 21st century. By teaching young people about the environment and how to care for it, these programs not only help protect it but also give future generations the tools they need to make lasting changes.

Objectives

1. To explore the integration of green education and sustainable practices into school and university syllabi.
2. To be aware of the present key government programs and future initiatives on green education and different policies.

Methodology

This study has reviewed and critically analyzed existing literature to examine the role of green education in fostering sustainability in 21st-century India. Relevant academic databases and Google Scholar have been used to identify the scholarly articles for this study. The study also included information from government reports, policy papers, and educational frameworks. The chosen studies were evaluated for their pertinence to environmental education and sustainable practices. The focus was on teaching methods, creating new curricula, and raising awareness. The findings were combined to learn how green education affects India's long-term development. This paper facilitates a thorough and detailed interpretation of the prevailing knowledge in the domain of Green Education.

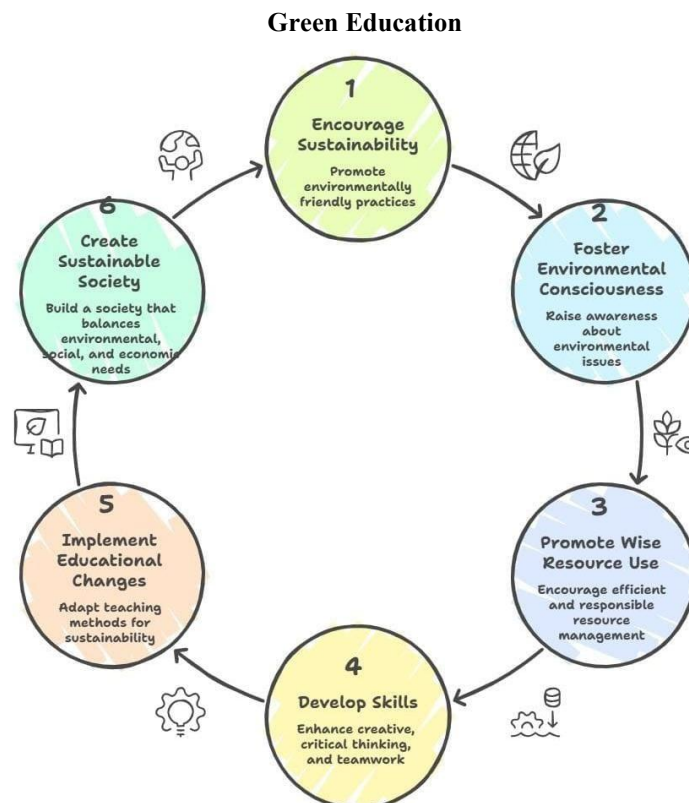
Concept of Green Education

Green education is an approach to teaching that encourages sustainability, environmental consciousness, and the wise use of natural resources. Green education, also referred to as environmental education or sustainability education, is an instructional approach focused on educating individuals about environmental issues, ecological principles, and sustainable practices (Ardoin et al., 2019). It aims to impart knowledge about various environmental challenges such as climate change, biodiversity loss, pollution, and resource depletion, while stressing the importance of taking proactive steps to address these issues (Shin et al., 2022). The primary objective of green education is to enhance awareness, foster understanding, and encourage action related to environmental conservation, sustainability, and responsible interactions with the natural environment. It promotes the adoption of sustainable behaviours, active participation in community initiatives, advocacy for policy changes, and making environmentally conscious choices (Suárez et al., 2023). It also improves skills such as creative and critical thinking, working together to make decisions, and calls for big changes in how education is done today (Papathanasiou et al., 2014). Green education is clearly necessary for creating a sustainable society, and it is still important at all levels of formal education and training, as well as in informal and non-formal settings. It includes the education needed to keep and improve the quality of the current and future generations (Juntunen & Aksela, 2014).

Objectives of green education:

1. To make students more aware of the environment.
2. To encourage eco-friendly behaviour and lifestyles that last.
3. To get people to think critically about problems with the environment.
4. To get students ready to help solve problems with the environment.

Green education also plays a critical role in cultivating environmentally literate and responsible citizens capable of tackling present and future environmental challenges. Education overall plays a pivotal role in fostering sustainability literacy (Kuehl et al., 2023). Specifically, green education contributes directly to sustainability literacy, forming a foundation for understanding sustainability and the Sustainable Development Goals (SDGs). It empowers individuals to contribute actively to the creation of a sustainable and resilient world (Mbalisi & Ndulor, 2019).



The Role of Green Education in Achieving Sustainable Development Goals

Green education is very important for making the world more sustainable because it raises awareness, encourages responsible behaviour, and promotes eco-friendly practices. As problems like climate change, pollution, and resource depletion worsen in the 21st century, education has become a powerful way to address them. Green education teaches people about the environment, its values, and how to use that knowledge and skills to help with sustainable development. The United Nations Sustainable Development Goals (SDGs) show the importance of education in creating a sustainable future. SDG 3 (Good Health and Well-being) and green education promotes the physical and mental well-being of students and emphasis on environmental health awareness. Goal 4 (Quality Education) is the only goal that specifically talks about education for sustainable development. SDG 4 (Quality Education) aims to make sure that everyone has access to high-quality, fair, and inclusive education (Saini et al., 2022). Green education is more than just regular school. It teaches students about environmental issues like climate change, conservation, and living sustainably. It helps students learn how to think critically and encourages them to be more environmentally friendly in their daily lives.

Other sustainable goals, like climate action, clean water and sanitation, and responsible consumption, are also closely related to green education. Green education directly helps these goals by including ideas about sustainability in school and higher education curricula.

Green education can help societies become more productive and achieve SDG 6 (Clean water and Sanitation) by teaching people how to use water, how to find clean drinking water, and ensure access to safe and clean toilets by making sure they are properly maintained. Studies have shown that green schools use about 32% less water (Suárez et al., 2023), which saves money and has big benefits for society, like less stormwater runoff and less need to treat and transport wastewater.

Many studies, such as Bajaj & Chiu (2009), have recognised the significance of green education in attaining SDG 7 by mitigating carbon emissions through cleaner production, alongside enhancing energy accessibility. Since the 2002 World Conference on Sustainable Development (2002), cleaner production has become an important issue. Cleaner energy in production saves raw materials, energy, and water. It reduces energy costs (Moallemi et al., 2020) and also cuts down on the creation of dangerous and toxic compounds as by-products of energy generation and keeps these compounds from getting into the air, water, and soil. Green education can help to achieve SDG 8 (Decent Work and Economic Growth) by creating green jobs that help the economy grow without harming the environment. Investing in green education means investing in green jobs, which include making building products, green architecture, and green construction. Goal 8 aims to encourage long-term economic growth and make sure that everyone has a productive job (Department, 2023). This is related to the creation of green jobs.

The goal of Sustainable Development Goal 12 (Responsible Consumption and Production) is to make sure that people consume and produce things in a responsible way. This goal stresses the importance of recycling, cutting down on waste, and making the most of resources. Green education is an important part of reaching SDG 12 because it teaches people about living sustainably. It helps people make smart decisions, like using less plastic and saving energy. Schools and other organisations can encourage eco-friendly activities like planting trees and programs for getting rid of trash. Teaching kids about sustainability makes them more aware of the environment.

Green education is also a big part of SDG 13 (Climate Action). It gives people the power to take meaningful steps like lowering their carbon footprints (Chennai Institute of Technology, n.d.), saving energy, and supporting sustainable practices by teaching them about the causes and effects of climate change. Green education raises awareness and makes people feel responsible for protecting the planet for future generations.

Also, green education helps in SDG 15 (Life on Land), which is about protecting ecosystems and biodiversity on land. Environmental education teaches students how important forests, wildlife, and natural resources are. This makes them want to help protect these things and use land in a way that is good for the environment.

Table 1: Role of Green Education in Achieving Sustainable Development Goals

Roles of Green Education	Related SDGs
Encourages holistic thinking	SDG 3 (Good Health and Well-being)
Promotes quality education Reduces student absenteeism Provides unique learning opportunities	SDG 4 (Quality Education)
Decreases water usage	SDG 6 (Clean Water and Sanitation)
Reduces energy costs	SDG 7 (Affordable and Clean Energy)
Enhances teacher retention Creates green jobs	SDG 8 (Decent Work and Economic Growth)
Responsible consumption of resources Living Sustainably	SDG 12 (Responsible Consumption and Production)
Reduces carbon emissions	SDG 13 (Climate Action)
Protecting ecosystems & biodiversity on land	SDG 15 (Life on Land)

Greening Education Partnership

The Greening Education Partnership (GEP) is a global UNESCO initiative that brings people together to make sure every student is ready to face the climate crisis. It unites 98 countries and more than 2,000 organisations to “green” education systems by 2030—through greener curricula, eco-friendly schools, better teacher training, and community-based learning. GEP, with 80 member states, takes a whole-system approach, aiming to turn at least 50% of all schools, colleges, and universities into Green Schools, and to make national curricula in 90% of countries truly climate-smart. The need is clear: a recent UNESCO study found that 70% of young people feel they only have a basic or limited understanding of climate change from what they learn in school, and almost 47% of the national curricula in 100 countries do not even mention climate change at all. This shows how much education still needs to catch up with the urgency of the planet’s situation.

The Greening Education Partnership is built on four key pillars of transformative education, closely linked to Sustainable Development Goal: greening schools, greening the curriculum, greening teacher training and education-system capacities, and greening communities.

A Green School, as defined by UNESCO, is a learning institution fully committed to Education for Sustainable Development (ESD), with a strong focus on tackling climate change. It follows a set of guiding principles: holistic education that nurtures critical thinking, creativity, empathy, self-awareness, and ethical values, often through personalized, experiential, and interdisciplinary learning and active community involvement; sustainability practices that reduce environmental impact by improving energy and water use, managing waste, and designing eco-friendly canteens, buildings, and schoolyards; and a strong sense of responsibility that weaves ESD into the curriculum to build problem-solving skills, climate awareness, and global citizenship. Green Schools also align with the Comprehensive School Safety Framework (CSSF), promoted by the Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector (GADRRRES), which was launched on 12 September 2022 and integrates safety, resilience, and sustainability into school environments.

Recently, UNESCO launched two new tools, the Greening Curriculum Guidance (GCG) and the Green School Quality Standards (GSQS), under the Greening Education Partnership.

- **Greening Curriculum Guidance (GCG)**

Greening Curriculum Guidance (GCG) is a practical tool that helps countries shape climate-smart education in a clear and consistent way. Its main purpose is to build a shared understanding of what climate education should look like, so schools and curriculum planners have a common starting point. It outlines how countries can weave environmental and climate topics into their curricula at different levels, from primary to higher secondary, and beyond. The guidance also sets out specific learning outcomes for children and youth from about 5 years old up to 18+, showing what learners should know and be able to do at each stage. Finally, it strongly recommends active and hands-on teaching methods—such as projects, experiments, and real-world activities—so that students don’t just memorise facts, but actually experience and practice climate-friendly thinking and behaviour.

- **Green School Quality Standard (GSQS)**

The Green School Quality Standard (GSQS) lays down clear, action-oriented guidelines to help schools become genuinely “green.” Its main objective is to set minimum requirements for what counts as a green school, so institutions can plan and improve in a structured way. It recommends forming green governance committees that include students, teachers, and parents, so decisions about sustainability are shared and transparent. The standard also calls for comprehensive training for teachers on environmental issues, so they can confidently bring climate and sustainability themes into everyday teaching. Schools are encouraged to carry out regular resource audits—looking closely at how they use energy, water, food, and how they manage waste—to identify easy ways to cut consumption and reduce environmental impact. Finally, GSQS highlights the importance of community engagement, urging schools to build stronger links with local communities so students can work on real-life environmental challenges in their own neighbourhoods.

Integration of Green Education and Sustainable Practices into School and University Syllabi

Incorporating green education and sustainable practices into curricula has become increasingly crucial for Indian schools and universities in the twenty-first century. Pollution, resource depletion, and climate change are growing more significant issues. To assist students in becoming environmentally conscious citizens, the Indian educational system is gradually incorporating sustainability concepts.

Green Education has importance across Different Education Levels. Green education is an important part of primary school that helps kids learn about the environment. At this stage, kids learn about basic ideas, including renewable energy, climate change, biodiversity, and how to deal with trash (Budiyanti et al., 2020; Dong, Zhang, Zhang, & Bi, 2023). Teachers can make kids more interested in nature and help them become more environmentally aware by using hands-on activities, field trips, and interactive learning methods (Ahmad & Fazirah, 2019; Tovar-Gálvez, 2021). The use of green principles in basic education is done through experiential learning, which focuses on direct experience in nature and lets students explore and learn about the environment directly (Boca & Saraçlı, 2019). Using stories, games, and activities that are appropriate for the child’s age to teach them about the environment makes them more curious and caring about it and its conservation. Teachers need to be able to break down ideas by talking about environmental issues in a way that is clear and straightforward, so that students can learn more in the future (Ahmad & Fazirah, 2019).

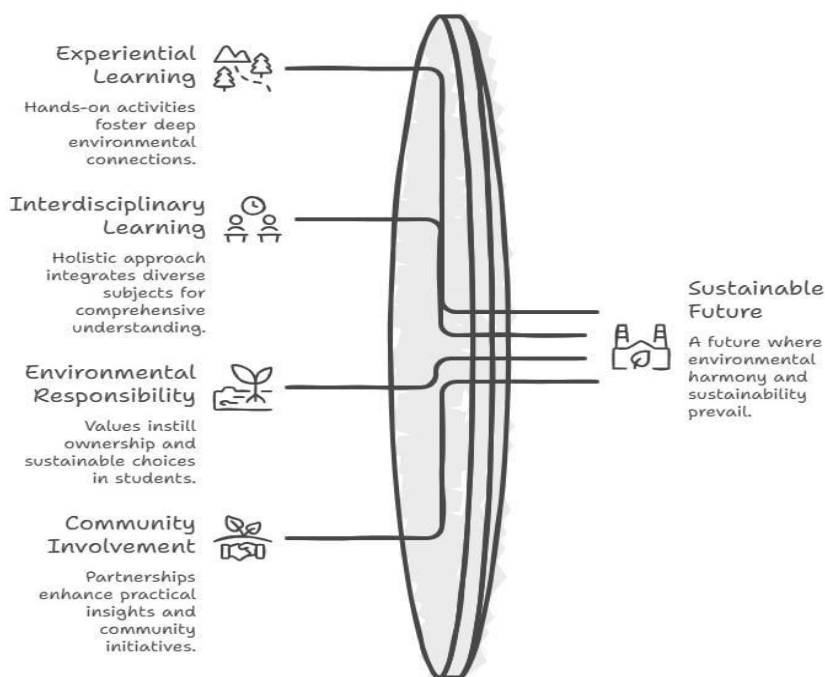
Green education in secondary schools is based on what students learn in primary schools. It goes further into environmental issues and talks about things like environmental justice, sustainable development, resource depletion, and ecological systems. Secondary education also stresses the importance of critical thinking and problem-solving skills, which help students look at difficult environmental problems and come up with new ways to solve them (Moftooh & Foumani, 2021; Sholahuddin & Sadiqin, 2021). Secondary education can give students the power to make a difference in their local settings by using project-based learning and being involved in their communities (Ballantyne, Fien, & Packer, 2001; Bruyere, 2008; Hsu, 2004; Servant-Miklos, 2022). In secondary education, curriculum development aims to foster critical thinking by engaging students in the analysis and evaluation of environmental issues; promoting independent thought and fundamental research skills pertinent to necessary solutions; involving learners in practical projects; motivating them to actively participate in addressing environmental challenges; and enhancing their comprehension of ecological systems, sustainability, and the interrelatedness of global environmental concerns (Sukma, Ramadhan, & Indriyani, 2020).

In higher education, green education builds on the knowledge and skills gained in the first few years. It offers particular programs and classes focused on green technology, environmental studies, and sustainability science. Higher education gives students the skills they need to deal with global environmental problems through research across disciplines, making policies, and running businesses in a way that is good for the environment. Higher education institutions may cultivate a culture of creativity and collaboration to develop leaders equipped to tackle intricate environmental challenges on a global scale (Adnyana & Sudaryati, 2022; Chen, Jeronen, & Wang, 2020; Suryani et al., 2019). Additionally, in higher education, the implementation of green education should prioritize and incorporate diverse disciplines to tackle intricate environmental issues from multiple viewpoints; foster advanced research, innovation, and collaboration to cultivate sustainable solutions; and prepare students with the expertise and competencies to emerge as leaders in promoting environmental policies and sustainable practices (Ardoin et al., 2020; Pihkala, 2020).

Important parts of using green education at different levels of school. There are a few main things that make up the application of green education ideas in primary, secondary, and higher education. First, it stresses experiential learning, which lets students deal with real-world problems in nature and the environment. Field trips, outdoor activities, and hands-on projects that encourage hands-on learning and a deeper connection with the environment can help with this. Second, green education encourages learning across disciplines because it understands that environmental problems are linked and need a holistic solution.

It is encouraged for different subjects, such as science, geography, social studies, and the arts, to work together to help students fully grasp environmental problems and how to fix them. Third, green education helped people feel like they were responsible for the environment and their country. This makes children responsible for what they do and helps them make decisions that are good for the environment every day. Green education teaches kids to care about the environment and work toward a better future by teaching them values like empathy, respect for nature, and social justice (Ardoin et al., 2020; Boca & Saraçlı, 2019; Suryani et al., 2019). Lastly, green education promotes working together and getting involved in the community. It understands how important it is to include local people, groups, and specialists in the learning process. Students can learn about real-world concerns, make connections, and help with community-based projects that deal with environmental problems by working with people outside of school.

Pathways to Sustainability



Key Programmes Related to Green Education in India

1. Government Initiatives

Environment Education Programme (EEP): The goal of the Environment Education Programme is to teach students about the environment through workshops, training, exhibits, and nature camps. It encourages students to learn about problems like pollution, loss of biodiversity, and climate change and helps them develop environmentally responsible behaviour. The program is a big part of getting people at the grassroots level to care about sustainability.

National Education Policy (NEP 2020): The National Education Policy 2020 makes environmental education a part of the curriculum at all levels. It focuses on hands-on learning through things like fieldwork, projects, and studies of the local environment. The policy encourages students to think critically about climate change, conservation, and sustainability, which makes green education a constant and useful way to learn.

PM SHRI Schools: The PM SHRI Schools scheme promotes model schools that foster green practices like solar energy, water conservation, and eco-friendly infrastructure. These schools act as examples of sustainable campuses and help students learn environmental responsibility through real-life practices.

Swachh Evam Harit Vidyalaya Rating (SHVR): The Indian government and organisations like CBSE have asked all schools participating in the Swachh Evam Harit Vidyalaya Rating (SHVR) program for 2025-26 to obtain sustainability ratings. This would help make schools cleaner, greener, and more welcoming to all students. The Green School Initiative from Tata Steel Foundation and TERI is helping student-led projects grow all around the country, from planting trees to sorting trash. These efforts combine ancient ecological knowledge with current climate education, equipping students to be creative agents of environmental change.

2. School-Level Programme

Eco-Schools Programme: The Eco-Schools Program is a global effort that India is taking part in to make schools more environmentally friendly. It uses a structured approach that gets students involved in managing the environment by doing things like reducing waste, saving energy, and protecting biodiversity. A "Green Flag" certification is given to schools that meet high standards.

Green Schools Programme: The Green Schools Program encourages students to check their schools' environmental impact. They look at how resources like water, energy, and trash are used and make suggestions for how to do better. This program encourages learning by doing and helps people learn how to solve problems related to the environment.

The Green School Project 2.0 (TERI & Tata Steel Foundation): In the Green School project 2.0, the Tata Steel Foundation (TSF) and TERI have worked together for the first time. The goal of this program is to help students in Tata Steel's operations areas learn to think critically, learn across subjects, and deeply comprehend the ideals of protecting the environment. The Green School initiative gives young people the power to speak out for the health of our world by making changes in their own lives. It does this by combining topics like energy, water, forests and biodiversity, and waste with climate change and the Sustainable Development Goals (SDGs).

Urja Chetana Programme (CEE East): As part of its corporate social responsibility (CSR) efforts, Calcutta Electric Supply Corporation Limited (CESC Ltd.) has been helping CEE East run the Urja Chetana program since 2012. Urja Chetana is an environmental education program that aims to raise awareness and encourage action among students, teachers, and the community about the environment and sustainable development. So far, eco- and energy clubs have brought the concept to about 50 government and private schools in and around Kolkata. The initiative gives schools a way to do action projects in the community, which helps kids share and learn more, which leads to changes that have cut down on energy waste, rainfall waste, garbage management, and plant care.

3. College/University-Level Programme

CSE University Programme: The Centre for Science and Environment runs programs that teach sustainability to college students. These programs teach students how to deal with real-world environmental problems by focusing on climate change, resource management, and environmental leadership.

Green Campus Initiative: A lot of colleges and universities use green campus practices like recycling, using renewable energy, and saving water. These programs turn campuses into living labs where students learn about sustainability by watching and doing things.

Green education programmes in India combine policy support, practical learning, and community participation. From school eco-clubs to university-level sustainability initiatives, these programmes aim to develop environmentally responsible citizens and promote sustainable development in the country.

Major Challenges in Greening the Education Sector in India

Greening the education sector in India is full of promise, but it also faces several real-world challenges that make it harder to move quickly and equitably. One big hurdle is the lack of a strong, nationwide sustainability policy; while there are some green initiatives, India still does not have a clear, comprehensive policy that requires and guides all schools and colleges to include environmental sustainability at every level. Many institutions, especially in rural and semi-urban areas, also struggle with basic

infrastructure—like poor electricity, water supply, and sanitation—which makes it tough to even start adopting sustainable practices.

Even though environmental studies are taught in many schools and colleges, there is limited integration of sustainability in curricula. Broader ideas of sustainability are rarely woven into core subjects like science, maths, or social studies, so students often see them as separate topics rather than part of everyday life. Teachers also need better support: many teacher-training programs do not give enough training or resources on how to teach sustainability in a practical, engaging way, so educators feel unsure about how to bring these ideas into their classrooms. Finally, sustainable building materials and technologies—like efficient solar systems, low-impact construction materials, and water-saving fixtures—are still not easy to get and often cost more, which makes it harder for many schools, especially in remote and rural areas, to create truly green campuses.

Future Initiatives for Green Education

A strong way forward for greening education in India lies in a mix of student energy, teacher support, smart purchasing, and real-world problem solving.

Eco-influencer campaigns can tap into the power of social media influencers and student leaders to spread climate awareness and inspire eco-friendly habits through relatable videos, challenges, and campus-driven content. At the same time, green pedagogy workshops can train teachers in creative, sustainability-focused methods such as project-based learning, inquiry-based learning, and experiential activities, so that environmental topics become part of everyday classroom practice rather than just one subject. Schools can also adopt a sustainability-linked procurement policy, choosing energy-efficient appliances, encouraging students to use notebooks made from recycled paper, and prioritising eco-friendly supplies; this reduces environmental impact, models responsible choices, and may even save money over time—though special attention is needed to ensure reliable suppliers in rural and remote areas. Finally, environmental entrepreneurship competitions can give students a platform to design innovative solutions for local issues like waste, water, or air quality, helping them develop creativity, problem-solving skills, and a genuine spirit of green innovation for real communities.

As India faces more and more environmental problems like climate change, pollution, and resource depletion, green education is becoming more and more important. Several programs are expected to improve environmental awareness and sustainability through education in the next few years. Implementation of the National Education Policy 2020 is a significant step in this direction, as it encourages schools to incorporate environmental topics into their lessons. This policy supports hands-on and cross-disciplinary learning, which helps students understand ecological problems in the real world. The National Council of Educational Research and Training and other educational organisations are also working to update textbooks to include lessons on climate change and sustainability. Another important step is to encourage skill-based learning in fields like renewable energy, organic farming, and protecting the environment. The Ministry of New and Renewable Energy and other groups will probably be very important in creating training programs for green jobs. Also, activities in the community, like tree planting drives and clean-up campaigns, will help students take an active role in protecting the environment. Furthermore, more and more universities are offering courses and research opportunities in environmental science and sustainability in higher education. Programs like the Green Schools Program also help schools become more environmentally friendly and teach students about the importance of doing so.

Conclusion

The success of green education programs is very important for the future of sustainability in India in the 21st century. India is slowly raising a generation that is more aware, responsible, and proactive about environmental issues by incorporating environmental awareness into school and university systems. Programs like eco-clubs, green school audits, and required environmental studies not only teach people about the environment, but they also get them to do something about it and change how they act. As environmental issues like climate change, resource depletion, and pollution intensify, green education will play a decisive role in shaping sustainable lifestyles and informed decision-making. With continued policy support, innovation, and community participation, these initiatives can transform educational institutions into hubs of sustainability. In the long run, green education is not only a requirement for schools but also a powerful way to build a nation by making sure that economic growth and environmental protection go hand in hand. So, Green Education is the key to making India's future balanced, strong, and long-lasting.

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