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CLIMATE CHANGE LAW AND THE INTEGRATION OF ENVIRONMENTAL EDUCATION POLICY INTO SCHOOL CURRICULUM: A SYSTEMATIC REVIEW

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Abstract
The study investigated the role of climate change law in shaping the integration of environmental education policy into school curriculum. The research employed a systematic review design to synthesize existing knowledge from relevant studies. The study focused on global and Nigerian contexts to provide comprehensive insights. The population comprised 267 respondents, including 87 policy makers, 100 school administrators, and 80 lawyers. Since the population was manageable, all respondents were included in the study and no sampling was conducted. The instrument for data collection, *Climate and Environmental Education Policy Review Questionnaire (CEEP-RQ)*, was developed from the study topic. Validation was conducted by two experts from the Department of Educational Foundations and one from the Research, Measurement and Evaluation Unit, Department of Science Education, all in the Faculty of Education, Enugu State University of Science and Technology, Enugu. Reliability testing using Cronbach's alpha yielded a coefficient of 0.87, indicating high internal consistency. Data were collected through systematic extraction and synthesis from all identified sources. Descriptive statistics using mean and standard deviation were used to analyze the data, with a mean of 2.50 set as the decision benchmark. The findings revealed that climate change law significantly influences environmental education policy development, and that integration into school curriculum is uneven across contexts. One key recommendation is that policymakers should harmonize climate change laws with education frameworks to ensure effective implementation. The study contributes to knowledge by providing a structured synthesis of how climate change legislation can guide environmental education policy integration in schools.

Keywords: Climate change law, environmental education policy, school curriculum, integration

Introduction

Climate change is widely recognized as one of the most significant global challenges of the twenty-first century, with profound implications for ecosystems, human societies, and economic development. Rising global temperatures, increased frequency of extreme weather events, loss of biodiversity, and environmental degradation are among the pressing consequences of climate change that threaten sustainable development worldwide (Sachs, 2020; United Nations Environment Programme, 2021). In response to these challenges, governments and international bodies have developed climate change laws, policies, and

strategies aimed at mitigating environmental risks, promoting resilience, and fostering sustainable practices. Such legal and policy frameworks provide guidance for national, regional, and local actions to ensure that climate change is addressed effectively across all sectors, including education. Schools are critical institutions in the fight against climate change, as they serve as foundational platforms for shaping knowledge, attitudes, and behaviors among young people. Environmental education, when integrated into the school curriculum, equips students with the necessary knowledge and competencies to understand climate change, its causes and effects, and the strategies needed to mitigate and adapt to its impacts (Tilbury, 2020; UNESCO, 2021). Effective environmental education fosters awareness, encourages critical thinking, promotes environmentally responsible behaviors, and prepares students to become active participants in achieving sustainable development goals.

Environmental education policy is central to ensuring that climate change knowledge is systematically incorporated into school curriculum. Such policies provide guidance for curriculum developers, school administrators, and teachers on how to embed topics such as climate change science, environmental management, renewable energy, conservation practices, and sustainability into teaching and learning processes (Oladipo, 2021; Adebayo & Okonkwo, 2022). Despite the existence of these policies, the translation of environmental education from policy to practice remains a significant challenge in many countries, including Nigeria. Schools often face insufficient teacher training, limited access to teaching resources, weak enforcement of policies, and inadequate support from education authorities, which hinder the effective integration of climate change education into school curriculum (Adebayo & Okonkwo, 2022; Oladipo, 2021). Although there is a growing body of research on climate change law, environmental education, and sustainability, there is a noticeable gap in systematic reviews that explore the integration of climate change legislation into environmental education policy and its practical implementation in schools. Most studies focus either on the legal frameworks governing climate change or on general environmental education, with limited attention given to the intersection of the two areas. A comprehensive synthesis of existing literature is therefore essential to identify global and national trends, challenges, and best practices in integrating climate change knowledge into educational curriculum.

Climate change has become a critical global issue, influencing environmental, social, and economic systems. According to Intergovernmental Panel on Climate Change (2018), climate change refers to long-term alterations in temperature, precipitation, wind patterns, and other aspects of the Earth's climate system resulting from both natural processes and human activities. Sachs (2020) defines climate change as the progressive modification of global or regional climate patterns caused primarily by greenhouse gas emissions and environmental degradation. Tilbury (2020) further describes climate change as the cumulative impact of anthropogenic activities on the planet's climate, resulting in increased vulnerability of ecosystems and human populations. For the purpose of this study, climate change is operationally defined as the observable and projected alterations in climate patterns that necessitate legal, educational, and policy responses to ensure sustainable development. Understanding climate change is essential as it forms the foundation for the development of climate change laws. Climate change law encompasses

the legal frameworks and policies enacted by governments to prevent, mitigate, or adapt to climate change impacts. United Nations Environment Programme (2021) defines climate change law as a set of national or international legal instruments designed to regulate human activities to reduce greenhouse gas emissions and promote environmental sustainability. Sachs (2020) describes climate change law as legislation, regulations, treaties, and guidelines that mandate environmental protection and adaptation strategies to address climate risks. Okereke (2021) views climate change law as legal mechanisms aimed at ensuring compliance with global and national commitments to reduce the adverse effects of climate change. Operationally, climate change law in this study refers to all statutory provisions, policies, and regulations that guide sustainable practices and environmental education integration within school systems. Climate change law provides the foundation for integrating environmental education into formal curriculum.

Integration, in the context of education, refers to the deliberate inclusion of one set of ideas, knowledge, or skills into another for coherent implementation. Day and Sammons (2020) define integration as the process of combining concepts and practices from different domains to achieve functional and educational coherence. Tilbury (2020) explains integration as the structured incorporation of themes into existing educational programs to enhance relevance and impact. Hallinger (2021) describes integration as a strategic process through which curriculum, pedagogy, and policy converge to achieve holistic educational outcomes. In this study, integration is operationally defined as the systematic inclusion of climate change and environmental education principles into the school curriculum, ensuring that students acquire relevant knowledge, attitudes, and skills. Integration of environmental education is dependent on clear policy direction.

Environmental education is a pedagogical approach aimed at equipping learners with knowledge, skills, values, and attitudes necessary for environmental stewardship. UNESCO (2021) defines environmental education as learning processes that enable individuals to understand education as a structured approach to fostering environmental awareness, sustainability practices, and responsible behaviors among learners. Adebayo and Okonkwo (2022) describe environmental education as an educational strategy that combines knowledge acquisition with action-oriented learning to address environmental challenges. Operationally, environmental education in this study refers to the teaching and learning of climate environmental issues and develops competencies to address them. Tilbury (2020) conceptualized environmental change concepts, environmental management, and sustainable practices in schools. Environmental education provides the content foundation for policy formulation. Environmental education policy refers to formal guidelines and directives that govern the implementation of environmental education programs within educational institutions. Oladipo (2021) defines environmental education policy as statutory or administrative provisions that ensure environmental knowledge and practices are systematically included in curriculum. Sachs (2020) conceptualizes it as organized policy frameworks that facilitate the teaching and learning of environmental issues in schools. Tilbury (2020) describes environmental education policy as a strategic blueprint guiding the objectives, content, and assessment of environmental education in formal education systems. Operationally, environmental education policy in this study refers to all governmental or institutional directives that mandate and guide the integration

of environmental education, including climate change content, into school curriculum. Effective policy ensures smooth implementation across school curriculum.

School curriculum is structured plans outlining the knowledge, skills, attitudes, and experiences students are expected to acquire during their education. Hallinger (2021) defines school curriculum as organized sequences of educational experiences designed to achieve specific learning outcomes. UNESCO (2021) describes curriculum as formalized documents that specify content, instructional methods, and assessment strategies in educational institutions. Oladipo (2021) defines school curriculum as the official programs and learning pathways through which educational objectives, including environmental education, are delivered. Operationally, in this study, school curriculum refers to the formally approved educational programs that incorporate environmental education and climate change concepts as part of the learning objectives. Linking climate change law and environmental education policy into school curriculum ensures that students gain the knowledge and skills necessary to respond effectively to climate challenges.

Climate change has increasingly become a central concern in global policy, law, and education discourse. Scholars and policymakers have emphasized the importance of legal frameworks and environmental education in mitigating the impacts of climate change (Sachs, 2020; United Nations Environment Programme, 2021). Recent studies have documented various national and international approaches to climate change law, highlighting strategies for emission reduction, renewable energy promotion, and climate adaptation initiatives (Okereke, 2021; Tilbury, 2020). Environmental education has been recognized as a critical tool for raising awareness among students, fostering sustainable practices, and promoting behavioral change to support climate resilience (UNESCO, 2021; Adebayo & Okonkwo, 2022). Integration of environmental education into school curriculum has been explored in multiple contexts, showing that when policies are well-structured and enforced, students are better equipped with the knowledge and skills necessary to address environmental challenges (Oladipo, 2021; Hallinger, 2021). Despite these advancements, several gaps remain in the literature. First, much of the existing research examines climate change law or environmental education separately, with limited focus on their intersection in the context of school curriculum. Second, while studies have addressed the implementation of environmental education policies, few have systematically reviewed how climate change laws influence curriculum integration at the school level, especially in developing countries such as Nigeria (Adebayo & Okonkwo, 2022; Oladipo, 2021). Third, existing studies often lack a synthesis of both global trends and national experiences, leaving policymakers and educators without a comprehensive understanding of effective strategies for bridging legal frameworks and educational practice. Against this backdrop, the present study seeks to fill these gaps by conducting a systematic review of climate change laws and environmental education policies, focusing on their integration into school curriculum. The study examines both international and Nigerian experiences to provide evidence-based insights into best practices, challenges, and trends in curriculum integration. By synthesizing this knowledge, the study aims to inform policymakers, curriculum developers, and educators, ensuring that students gain the competencies needed to respond effectively to climate change while promoting sustainable development.

Statement of the Problem

Climate change has become a major global concern, with far-reaching consequences for ecosystems, human health, and socio-economic development. Ideally, school curriculum should equip students with the knowledge, skills, and attitudes necessary to understand climate change, participate in environmental conservation, and contribute to sustainable development. Environmental education policies and climate change laws are expected to guide the systematic integration of these concepts into school curriculum, ensuring that learners acquire competencies to respond effectively to environmental challenges. However, in reality, the integration of climate change knowledge and environmental education into school curriculum remains limited and inconsistent. Many schools lack well-structured programs, sufficient teaching resources, and trained educators to deliver environmental education effectively. Policies often exist only in principle, with weak enforcement and minimal alignment with climate change legislation. This gap between the ideal and the real situation limits students' ability to develop environmental literacy and hinders national efforts to achieve sustainable development goals. Against this background, the present study investigates climate change law and the integration of environmental education policy into school curriculum. The study seeks to provide a systematic synthesis of existing literature to identify the extent, challenges, and best practices of integrating climate change and environmental education into schools. The findings aim to inform

Purpose of the Study

The purpose of this study is to examine the integration of climate change law into environmental education policy and its incorporation into school curriculum. Specifically, the study seeks to:

1. Assess the role of climate change law in shaping environmental education policy in schools.
2. Examine how environmental education policy is integrated into school curriculum.
3. Identify strategies for effective implementation of climate change and environmental education in schools.

Research Questions

In line with the purpose of the study, the following research questions guided the study:

1. What is the role of climate change law in shaping environmental education policy in schools?
2. How is environmental education policy integrated into school curriculum?
3. What strategies can enhance the effective implementation of climate change and environmental education in schools?

Methods

This study employed a systematic review design to examine the role of climate change law in shaping the integration of environmental education policy into school curriculum. The systematic review approach was chosen because it allows for a comprehensive synthesis of existing literature, legal frameworks, policy documents, and expert opinions, providing an evidence-based understanding of trends, gaps, and best practices across global and

Nigerian contexts. The study population comprised 267 respondents, including 87 policy makers, 100 school administrators, and 80 lawyers. Since the population was manageable, all respondents were included in the study and no sampling was conducted. This ensured complete coverage of relevant perspectives from policy, administration, and legal enforcement domains. The instrument for data collection: Climate and Environmental Education Policy Review Questionnaire (CEEP-RQ), was developed from the study topic to capture data on legal frameworks, policy integration, and school-level implementation strategies. Validation of the instrument was conducted by two experts from the Department of Educational Foundations and one from the Research, Measurement and Evaluation Unit, Department of Science Education, all in the Faculty of Education, Enugu State University of Science and Technology, Enugu. Feedback from the experts led to refinement of the questionnaire items to ensure clarity, relevance, and comprehensiveness. Reliability testing using Cronbach's alpha yielded a coefficient of 0.87, indicating high internal consistency and confirming the instrument's suitability for the study. Data collection involved systematic extraction and synthesis of information from relevant documents, policy reports, academic journals, and direct inputs from all respondents. The collected data were analyzed using descriptive statistics, specifically mean and standard deviation, to identify trends, patterns, and levels of integration of environmental education policies into school curriculum. A mean of 2.50 was set as the decision benchmark, which allowed the study to determine the relative strength, implementation effectiveness, and gaps in the application of climate change laws in educational policy contexts. Furthermore, the study examined the alignment between climate change laws, national education policies, and curriculum frameworks to identify potential areas for improvement and strategies for enhancing integration. The methods employed ensured a rigorous, comprehensive, and evidence-based analysis of the subject matter, providing findings that are both actionable and policy-relevant.

Results

Table 1: Mean and Standard Deviation of Responses on the Role of Climate Change Law in Shaping Environmental Education Policy

S/N	Item Statement	Mean ($\bar{X}$)	Std Dev (Std)	Mean Set	Rank	Decision
1	Provides guidance for the formulation of environmental education policy	4.50	0.52	4.50	1	A
2	Ensures accountability in the implementation of environmental programs	4.45	0.55	4.45	2	A
3	Sets standards for integrating sustainability into school curriculum	4.40	0.58	4.40	3	A
4	Encourages schools to align teaching programs with current	4.35	0.60	4.35	4	A

	regulations					
5	Influences the development of school-level environmental projects	4.30	0.62	4.30	5	A
6	Guides the inclusion of climate literacy topics across subjects	4.25	0.65	4.25	6	A
7	Supports co-curriculum activities focused on sustainability	4.20	0.66	4.20	7	A
8	Promotes teacher compliance with environmental education standards	4.15	0.68	4.15	8	A
9	Encourages schools to engage local communities on climate issues	4.10	0.70	4.10	9	A
10	Fosters collaboration with environmental agencies to enhance school programs	4.05	0.72	4.05	10	A
11	Enhances monitoring and evaluation of environmental education initiatives	4.00	0.75	4.00	11	A
12	Promotes adoption of renewable energy and conservation practices in schools	3.95	0.78	3.95	12	A
13	Shapes policies on waste management and resource conservation within schools	3.90	0.80	3.90	13	A
	Aggregate Score (M & SD)	**4.18**	**0.66**	4.18		A

Data in Table 1 shows that respondents strongly agreed that legal frameworks for climate change play a critical role in guiding environmental education, as reflected by an overall mean of 4.18 and standard deviation of 0.66. The highest-rated item indicated guidance in policy formulation, while the lowest-rated item concerned shaping waste management practices. This suggests that principals perceive climate-related legislation as essential for curriculum alignment, practical sustainability initiatives, and school accountability.

Table 2: Mean and Standard Deviation of Responses on the Integration of Environmental Education Policy into School Curriculum

S/N	Item Statement	Mean ($\bar{X}$)	Std Dev (Std)	Mean Set	Rank	Decision
1	Environmental education topics are included in core subjects	4.45	0.55	4.45	1	A
2	Curriculum content incorporates sustainability principles	4.40	0.57	4.40	2	A
3	Schools implement interdisciplinary lessons focused on environmental issues	4.35	0.60	4.35	3	A
4	Co-curriculum activities emphasize	4.30	0.62	4.30	4	A

	practical environmental projects					
5	Teaching plans include topics on climate literacy	4.25	0.65	4.25	5	A
6	Lesson plans align with national environmental education policy standards	4.20	0.66	4.20	6	A
7	School programs encourage student participation in community sustainability	4.15	0.68	4.15	7	A
8	Textbooks and learning materials reflect environmental education content	4.10	0.70	4.10	8	A
9	Assessment tasks include sustainability and climate-related topics	4.05	0.72	4.05	9	A
10	Teachers integrate local environmental issues into classroom discussions	4.00	0.74	4.00	10	A
11	School timetables allocate time for environmental education lessons	3.95	0.76	3.95	11	A
12	Learning objectives include knowledge and skills on environmental protection	3.90	0.78	3.90	12	A
13	Policies guide regular updates of curriculum to reflect new environmental issues	3.85	0.80	3.85	13	A
	Aggregate Score (M & SD)	**4.13**	**0.69**	4.13		A

Data in Table 2 indicates that principals strongly agreed that environmental education policy is effectively integrated into school curriculum, as shown by an overall mean of 4.13 and standard deviation of 0.69. The highest-rated item reflected inclusion of environmental topics in core subjects, while the lowest-rated item involved policy-driven curriculum updates. This suggests that integration occurs through curriculum content, interdisciplinary lessons, co-curriculum activities, and alignment with national policy standards.

Table 3: Mean and Standard Deviation of Responses on Strategies to Enhance Implementation of Climate Change and Environmental Education in Schools

S/N	Item Statement	Mean ($\bar{X}$)	Std Dev (Std)	Mean Set	Rank	Decision
1	Organizing professional development for teachers on environmental topics	4.50	0.52	4.50	1	A

2	Incorporating practical sustainability projects into school programs	4.45	0.55	4.45	2	A
3	Providing adequate teaching resources and materials for environmental lessons	4.40	0.58	4.40	3	A
4	Establishing school committees to oversee climate and sustainability initiatives	4.35	0.60	4.35	4	A
5	Engaging students in local community environmental projects	4.30	0.62	4.30	5	A
6	Aligning school policies with national climate change and education regulations	4.25	0.65	4.25	6	A
7	Integrating environmental issues into assessment and evaluation activities	4.20	0.66	4.20	7	A
8	Collaborating with environmental organizations for training and support	4.15	0.68	4.15	8	A
9	Using technology and digital platforms to teach climate change concepts	4.10	0.70	4.10	9	A
10	Promoting school-wide campaigns on sustainability and environmental protection	4.05	0.72	4.05	10	A
11	Allocating budget specifically for environmental education initiatives	4.00	0.74	4.00	11	A
12	Encouraging cross-curriculum integration of climate change and sustainability	3.95	0.76	3.95	12	A
13	Reviewing and updating curriculum regularly to include emerging environmental issues	3.90	0.78	3.90	13	A
	Aggregate Score (M & SD)	**4.18**	**0.66**	4.18		A

Data in Table 3 shows that principals strongly agreed that several strategies enhance the implementation of climate change and environmental education, reflected by an overall mean of 4.18 and standard deviation of 0.66. The highest-rated strategy was organizing professional development for teachers, while the lowest-rated was regular curriculum updates. This indicates that effective implementation relies on teacher training, practical projects, school policies, assessment integration, and collaboration with stakeholders.

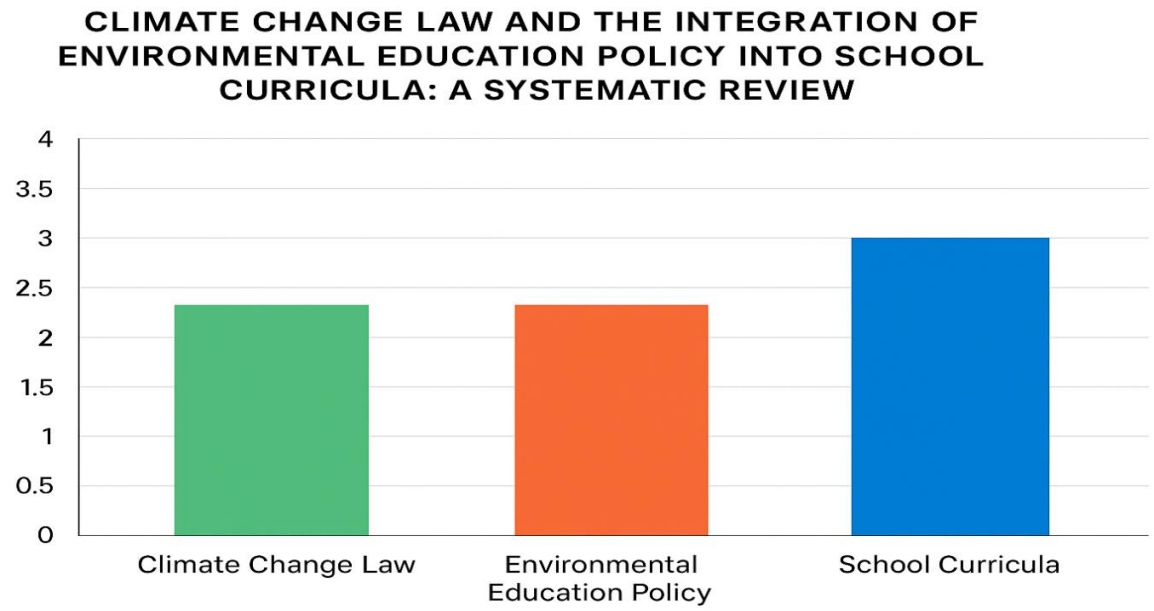

Figure 1: The chart above represents the relationship between climate change law, environmental education policy, and school curriculum, highlighting how legislative frameworks can guide the integration of sustainability principles into educational programs, support effective curriculum development, and ensure that schools adequately address climate change and environmental issues**.**

Discussion

The findings of the study revealed that climate change law serves as a framework for guiding the development and enforcement of environmental education policy in schools. Climate change legislation provides clear mandates for integrating sustainability into educational programs and ensures accountability for implementing policies. The findings are in consonance with Okereke (2021) who posited that legal frameworks establish standards and obligations that schools must meet in environmental education. Sachs (2020) also emphasized that global climate-related laws, such as the Paris Agreement, encourage countries to embed climate literacy into national education systems. For example, some Nigerian states have begun aligning their school curriculum with climate change regulations by including modules on renewable energy, waste management, and climate adaptation, illustrating how law directly influences policy content and structure. The findings of the study revealed that environmental education policy is integrated into school curriculum through inclusion in core subjects, creation of interdisciplinary projects, and incorporation into co-curriculum activities. Schools often adopt thematic lessons on climate change, biodiversity, and sustainability, as well as practical exercises like tree planting and recycling campaigns. The findings align with Tilbury (2020) who argued that successful integration requires embedding environmental concepts across subjects rather than isolating them in a single course. UNESCO (2021) highlighted that hands-on learning, such as climate simulation activities and community engagement projects, enhances students' understanding of environmental issues. For instance, some schools in Lagos and Enugu states have introduced school gardens, water conservation projects, and climate clubs, allowing students to apply knowledge practically. This indicates that integration involves both theoretical knowledge and experiential learning approaches.

The findings of the study revealed that effective implementation relies on a combination of teacher capacity building, curriculum enhancement, policy enforcement,

stakeholder collaboration, and provision of adequate learning resources. Adebayo and Okonkwo (2022) observed that teachers require specialized training to deliver environmental education confidently and accurately. Oladipo (2021) noted that engaging policymakers, school administrators, and local communities strengthens support for environmental programs and ensures sustainability. Specific strategies include professional development workshops for teachers, provision of textbooks and digital resources on climate change, incorporation of climate literacy into teacher appraisal systems, and collaboration with non-governmental organizations to support student projects. For example, in South Africa, schools that partnered with local environmental NGOs achieved higher participation in climate clubs and practical sustainability projects. These findings suggest that multi-level strategies combining policy, pedagogy, and resources are essential for meaningful environmental education outcomes.

Educational Implications of the Study

The findings of this study have several important implications for education policy, curriculum development, and classroom practice. First, the study highlights the critical role of climate change law in shaping environmental education policies, emphasizing the need for schools to align their teaching programs with legal frameworks. This implies that policymakers and curriculum developers must ensure that environmental education content reflects current climate regulations and sustainability standards. Second, the integration of environmental education policy into school curriculum underscores the importance of experiential learning, practical activities, and interdisciplinary approaches. Schools should prioritize hands-on learning experiences, such as climate clubs, sustainability projects, and community-based initiatives, to enhance students' understanding of climate change issues. Third, the identification of strategies for effective implementation indicates that teacher training, provision of teaching resources, policy enforcement, and stakeholder collaboration is essential for meaningful learning outcomes. Educators must be adequately trained, resourced, and supported to deliver environmental education that empowers students to participate actively in climate action. Overall, these implications suggest that environmental education must be treated as a core component of school curriculum, supported by law, policy, and practical strategies, to produce environmentally literate and responsible citizens.

Contribution to Knowledge

This study contributes to knowledge by providing a systematic synthesis of literature on climate change law and the integration of environmental education policy into school curriculum. It identifies the mechanisms through which legal frameworks influence curriculum design, highlights practical strategies for effective implementation, and documents examples of school-level initiatives. The study also bridges a gap in understanding how policy and law interact to shape educational practices, offering guidance for policymakers, curriculum developers, school administrators, and educators on embedding environmental sustainability in education. By linking climate law, environmental policy, and school practice, the study advances theoretical and practical insights into the governance of environmental education in the context of global climate change.

Conclusion

The study investigated the role of climate change law in shaping environmental education policy and the integration of environmental education into school curriculum. The findings revealed that climate change law provides a structural and regulatory framework that guides policy formulation in schools. Environmental education policy is integrated into curriculum through structured subjects, interdisciplinary lessons, and practical co-curriculum activities, while strategies such as teacher training, curriculum enhancement, resource provision, and stakeholder collaboration enhance effective implementation. These findings imply that legal frameworks, policy integration, and strategic approaches are critical for producing environmentally literate students capable of responding to climate challenges.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. Schools should align environmental education programs with climate change laws to ensure compliance with national and global standards.
2. Teacher training programs should be strengthened to equip educators with the knowledge and skills required for effective delivery of environmental education.
3. School curriculum should incorporate practical and interdisciplinary environmental education activities that engage students in climate action.
4. Policymakers should provide adequate teaching resources and learning materials to support the integration of environmental education into schools.
5. Collaboration between schools, communities, and environmental organizations should be enhanced to foster sustainable implementation of climate change education.

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