

## **An Assessment of the Issues on Climate Change for Education in Nigeria**

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### **Abstract**

Climate change poses a multifaceted challenge to education in Nigeria, requiring a comprehensive understanding of its impacts and the development of adaptive strategies. The study is qualitative research and as such relied on secondary data. A descriptive research design was used, as it enables a thorough analysis of existing data sources related to climate change and education in Nigeria. The Vulnerability, Impact, and Adaptation (VIA) Model provides a conceptual framework, emphasizing the interconnectedness of environmental shifts and educational systems. Vulnerability assessments reveal the exposure of educational infrastructure to climate-related risks, including extreme weather events and changing precipitation patterns. The implications extend beyond physical disruptions, affecting attendance rates, teacher well-being, and community livelihoods. Mitigating these challenges necessitates adaptive measures embedded in climate-resilient education policies. Government initiatives are pivotal, focusing on infrastructure development, teacher training, and curriculum integration. International collaborations and partnerships with global organizations contribute to resource mobilization, knowledge exchange, and capacity building. However, the effectiveness of these measures is contingent on community engagement, recognizing the context-specific nature of vulnerability and adaptation. The literature underscores the urgency of addressing climate change in education, emphasizing the collective responsibility of governments, communities, and international stakeholders. As climate change continues to unfold, integrating resilience into education emerges as a critical pathway toward sustainable development in Nigeria.

**Keywords:** Climate Change, Education, Assessment, Issues, VIA Model & Nigeria

### **Introduction**

Climate change is a pressing global challenge that transcends geographical boundaries, affecting ecosystems, economies, and societies worldwide. It is a phenomenon characterized by long-term alterations in temperature, precipitation patterns, and atmospheric conditions. The Intergovernmental Panel on Climate Change (IPCC) defines climate change as a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer (IPCC, 2014).

The primary driver of contemporary climate change is the increase in greenhouse gas concentrations, primarily carbon dioxide, methane, and nitrous oxide, resulting from human activities such as the burning of fossil fuels and deforestation. These activities intensify the greenhouse effect, trapping heat in the atmosphere and leading to alterations in temperature patterns. The consequences of climate change are both global and region-specific, with profound implications for ecosystems, economies, and other sectors of the society including education, health and the overall well-being of individuals and societies. Rising global temperatures

contribute to the melting of polar ice caps and glaciers, causing a rise in sea levels (IPCC, 2014). This has direct repercussions for low-lying coastal regions globally.

On a regional scale, climate change manifests through altered precipitation patterns, more frequent and severe weather events, and shifts in ecosystems. In Africa, including Nigeria, the impacts are diverse and include prolonged droughts, erratic rainfall, and increased frequency of extreme weather events (Adger, Arnell & Tompkins, 2007). These changes pose significant challenges to sectors vital for sustainable development, including agriculture, water resources, and education.

Nigeria, like many other regions in the world, is experiencing the adverse impacts of climate change. The country's climate is characterized by a diverse range of ecosystems, including arid and semi-arid regions in the north, tropical rainforests in the south, and coastal areas along the Atlantic Ocean. These diverse landscapes make Nigeria susceptible to a variety of climate-related challenges, with implications for the environment, economy, and social well-being (Nkemdirim, 2012). Nigeria has witnessed a gradual increase in temperature over the past decades, leading to more frequent and intense heatwaves. This rise in temperature contributes to water scarcity, affects agricultural productivity, and poses health risks, particularly in urban areas (Adelekan, Johnson, Akinbode & Manda, 2015). Climate change has disrupted traditional rainfall patterns in Nigeria, leading to irregular precipitation. Prolonged droughts and unexpected heavy rainfall events have become more common, impacting agricultural activities and water resource management (Olaniran, Igbinsola & Oluwatayo, 2015). The southern coastal regions of Nigeria are vulnerable to rising sea levels and coastal erosion, exacerbated by climate change. This poses a threat to communities, infrastructure, and ecosystems in these low-lying areas (Eriksen, Brien & Sygna, 2010). The arid and semi-arid regions in northern Nigeria face increased desertification, water scarcity, and a higher risk of crop failure due to rising temperatures. These challenges impact the livelihoods of communities' dependent on agriculture and pastoralism (Ojo, Oguntunde & Mertz, 2019).

Communities along the coast, such as the Niger Delta region, are vulnerable to the impacts of sea-level rise and coastal erosion. These areas are not only ecologically rich but are also home to many socio-economically marginalized communities whose lives are intricately linked to the coastal environment (Eriksen, Brien & Sygna, 2010). Rapid urbanization, particularly in cities like Lagos and Port Harcourt, exacerbates the effects of climate change. Increased heat, flooding, and strain on infrastructure pose significant challenges to the growing urban populations, with implications for public health and well-being (Adelekan, Johnson, Akinbode & Manda, 2015).

Education is crucial for raising awareness about climate change and promoting environmental stewardship. Through climate education, individuals are empowered to adopt sustainable practices, reduce carbon footprints, and engage in climate change mitigation efforts (UNESCO, 2016). Educational programs that integrate climate science, sustainable development, and environmental responsibility can foster climate resilience within communities and promote adaptive capacities to cope with climate-related impacts (Anderson, 2010).

Climate change poses significant challenges to educational access, particularly in regions prone to extreme weather events. Floods, droughts, and other climate-induced disasters can damage school infrastructure, displace populations, and disrupt the education of children and youth. For instance, flooding events in vulnerable regions may prevent students from attending school, while droughts

can force families into livelihood crises, making education a lower priority. Children from marginalized or low-income backgrounds, who are already at a disadvantage, are more likely to experience interruptions in their education due to climate-related disasters (World Bank, 2016). This can result in lower educational attainment, reduced cognitive development, and diminished economic opportunities later in life.

## **Methodology**

The study is qualitative research and utilizes secondary sources of data. A Descriptive Research Design is used, as it enables a thorough analysis of existing data sources related to climate change and education in Nigeria. Data was collected from reputable sources, such as *National Aeronautics and Space Administration (NASA)*, *Intergovernmental Panel on Climate Change (IPCC)* reports, and the Global Carbon Project for climate change trends, temperature, and precipitation data. In-depth analysis of policy documents, case studies, and reports to identify themes related to climate change challenges and adaptive mechanisms for resilient education in Nigeria. A comparative analysis of findings from multiple secondary sources to validate the consistency of climate trends and education issues identified was done.

## **Conceptual Clarifications**

Climate change is a multidimensional challenge that transcends geographical boundaries, impacting ecosystems, societies, and economies globally. The Intergovernmental Panel on Climate Change (IPCC) defines climate change as "a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties" (IPCC, 2014). The literature underscores the anthropogenic causes of climate change, primarily driven by the increase in greenhouse gas emissions resulting from human activities (IPCC, 2014; Le Quéré, Andrew, Friedlingstein, Sitch, Pongratz & Manning, 2018). The literature highlights the extensive impacts of climate change on ecosystems and biodiversity. Rising temperatures, changing precipitation patterns, and extreme weather events contribute to habitat loss, altered migration patterns, and increased extinction risks for many species. Studies emphasize the need for conservation strategies and sustainable land management practices to mitigate these ecological disruptions (Bellard, 2012; Díaz, 2019).

The societal and economic consequences of climate change are profound. Increased frequency and intensity of extreme weather events, such as hurricanes, floods, and droughts, have devastating effects on vulnerable communities (Field et al., 2014). The literature emphasizes the disproportionate impacts on marginalized populations, urging for equitable adaptation and resilience-building strategies (Adger et al., 2007).

Scholarly work underscores the importance of both mitigation and adaptation strategies to address climate change. Mitigation involves reducing greenhouse gas emissions to limit further climate change, while adaptation focuses on building resilience to the existing and anticipated impacts (IPCC, 2014). The literature explores various mitigation and adaptation measures, including renewable energy transition, sustainable land use, and the development of climate-resilient infrastructure (Hurlimann, 2014; Nwankpa, 2022).

International agreements, such as the Paris Agreement, play a pivotal role in the global response to climate change. The literature examines the effectiveness of these agreements in fostering collaboration among nations to achieve emission reduction targets and enhance climate resilience (Bodansky, 2016; Falkner, 2016). Challenges related to enforcement and compliance are also discussed, highlighting the need for strengthened international governance mechanisms. As the understanding of climate change deepens, there is a growing emphasis on interdisciplinary research and policy integration. The literature calls for collaborative efforts across scientific disciplines, social sciences, and policy domains to address the complex and interconnected nature of climate change challenges.

Education on the other hand can be broadly defined as the process of learning and acquiring knowledge, skills, values, and attitudes that help individuals think critically and creatively, interact with others, and make informed decisions. It plays a central role in shaping individuals' perceptions, ethics, and societal contributions, it is also seen as the systematic process of facilitating learning, encompassing the acquisition of knowledge, skills, values, and attitudes. This process occurs through various formal and informal means, including instruction, training, and experiential learning, with the goal of preparing individuals for personal development, societal participation, and professional endeavors. In a scholarly context, education is often conceptualized as a multifaceted and dynamic field. For instance, the United Nations Educational, Scientific and Cultural Organization (UNESCO) defines education as: A fundamental human right and the key to sustainable development. It provides knowledge, skills, and values that empower people to create a better society (UNESCO, 2019). This definition emphasizes the transformative role of education in empowering individuals and fostering positive societal change.

The purpose of education is to foster personal growth by developing cognitive abilities, emotional intelligence, and self-awareness. It builds a foundation for critical thinking, problem-solving, and decision-making. Education transmits cultural values and norms, helping to integrate individuals into society. It promotes shared values such as democracy, equality, and justice. It also enhances employability by equipping people with relevant skills, fostering economic development, and enabling social mobility. For many, education is the pathway to better employment opportunities and an improved standard of living. Furthermore, education fosters empowerment by enabling individuals to understand and exercise their rights and responsibilities. It encourages active citizenship and participation in democratic processes.

Education is divided into formal education which deals with structured, curriculum-based education that takes place in schools, colleges, and universities. This form is guided by standardized curricula and assessments, designed to achieve specific educational goals. Also, informal education which occurs outside formal institutions, often in daily life experiences, social interactions, and self-directed learning. Informal education plays a crucial role in lifelong learning and personal development. Moreover, non-formal education has to do with organized, short-term education programs that may not follow a formal curriculum, such as vocational training, adult education classes, or community workshops.

### **Theoretical Framework**

This study adopts the Vulnerability, impact and adaptation Model as the framework of analysis. The Vulnerability, Impact, and Adaptation (VIA) model is a conceptual framework commonly

used in the field of climate change studies to analyze the complex interactions between environmental changes and human systems. It is important to note that the VIA model does not have a single originator or a specific proponent, as it has evolved over time through contributions from various scholars and researchers in the field of climate change adaptation. The VIA model is a product of collaborative efforts within the broader field of climate change science and policy. Scholars and organizations, including the Intergovernmental Panel on Climate Change (IPCC, 2014), have contributed to the development and refinement of the model.

### **Major Assumptions of the VIA Model**

- i. The VIA model assumes that natural and human systems are interconnected. It recognizes that changes in the climate can have cascading effects on various aspects of human societies, including infrastructure, health, agriculture, and education.
- ii. Vulnerability, as per the VIA model, is understood as a multi-dimensional concept. It involves not only exposure to climate-related risks but also sensitivity and adaptive capacity. Vulnerability is context-specific and can vary across different regions and communities.
- iii. The model assumes that the impacts of climate change are diverse and can manifest in various ways, affecting both natural and human systems. It emphasizes the need for a comprehensive assessment of these impacts to understand the full scope of vulnerabilities.
- iv. The VIA model recognizes that adaptation is an ongoing and dynamic process. It is not a one-time action but involves continuous adjustments in response to changing environmental conditions. Adaptation strategies can include changes in policies, technologies, and societal practices.
- v. Context sensitivity is a fundamental assumption of the VIA model. It acknowledges that the vulnerability, impact, and adaptation dynamics are influenced by the specific social, economic, and environmental contexts of a region or community.

### **Application of Vulnerability Impact and Adaptation (VIA) model to the work**

The Vulnerability, Impact, and Adaptation (VIA) model is relevant in explaining climate change and its implications for education in Nigeria, as it provides a systematic framework for understanding the complex interactions between environmental changes and human systems. The VIA model begins with a vulnerability assessment, which is crucial for understanding how susceptible the education system in Nigeria is to the impacts of climate change. Nigeria faces various climate-related risks, including extreme weather events, changing precipitation patterns, and temperature increases. Assessing vulnerability helps identify specific areas within the education sector that may be most at risk, such as infrastructure, communities, or curriculum development.

The VIA model allows for a comprehensive analysis of the impacts of climate change on education in Nigeria. This involves examining direct and indirect consequences, such as disruptions to school infrastructure due to flooding, the health and well-being of students and teachers affected by extreme temperatures, and changes in agricultural practices affecting communities that rely on education for sustainable livelihoods.

In the Nigerian context, where climate change poses significant challenges, the VIA model guides the development of adaptation strategies for the education sector. These strategies may include the implementation of climate-resilient infrastructure, integration of climate change education into curricula, and community engagement initiatives. The model emphasizes the importance of adaptive capacity to enhance resilience. The VIA model recognizes the importance of context sensitivity. In Nigeria, where geographical, socio-economic, and cultural factors vary widely, understanding the specific vulnerabilities and impacts at the local level is crucial. The model's adaptability to different contexts allows for tailored adaptation strategies that consider the unique challenges faced by diverse regions within the country.

Community involvement is a key aspect of the VIA model. In Nigeria, engaging local communities in the adaptation process is essential, as they are often directly affected by climate change impacts. The model encourages participatory approaches that empower communities to contribute to the identification and implementation of climate-resilient education initiatives. The VIA model has implications for policy development. In Nigeria, incorporating the model into policy frameworks can guide the formulation of climate-resilient education policies at the national and regional levels. This can lead to the allocation of resources, development of teacher training programs, and the establishment of early warning systems to enhance the adaptive capacity of the education sector.

### **Climate Change: Implications for Education in Nigeria**

Education infrastructure, encompassing schools and related facilities, plays a pivotal role in fostering learning and development. However, the escalating impacts of climate change pose a substantial threat to the resilience and functionality of educational infrastructure, affecting the very foundation of the learning environment. Climate change contributes to an increase in the frequency and intensity of extreme weather events, such as hurricanes, floods, and storms. The resultant high winds, heavy rainfall, and storm surges can lead to structural damage and compromise the safety of school buildings. Extreme weather events pose a direct threat to the integrity of school buildings, impacting the safety and well-being of students and staff (UNESCO, 2019).

According to IPCC Report (2023, p.4), Human activities, principally through emissions of greenhouse gases, have unequivocally caused global warming, with global surface temperature reaching 1.1°C above 1850–1900 in 2011–2020. Global greenhouse gas emissions have continued to increase, with unequal historical and ongoing contributions arising from unsustainable energy use, land use and land-use change, lifestyles and patterns of consumption and production across regions, between and within countries, and among individuals. Global surface temperature was 1.09 (0.95 to 1.20) °C higher in 2011–2020 than 1850–1900, with larger increases over land (1.59 [1.34 to 1.83] °C) than over the ocean (0.88 [0.68 to 1.01] °C). Global surface temperature in the first two decades of the 21<sup>st</sup> Century (2001–2020) was 0.99 [0.84 to 1.10] °C higher than 1850–1900. Global surface temperature has increased faster since 1970 than in any other 50-year period over at least the last 2000 years.

Moreover, widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred. Human-caused climate change is already affecting many weather and climate extremes in every region across the globe. This has led to widespread adverse impacts and related losses and damages to nature and people (high confidence). Vulnerable communities who have historically contributed the least to current climate change are disproportionately affected (high confidence).

Approximately 3.3 to 3.6 billion people live in contexts that are highly vulnerable to climate change. Human and ecosystem vulnerability are interdependent. Regions and people with considerable development constraints have high vulnerability to climatic hazards. Increasing weather and climate extreme events have exposed millions of people to acute food insecurity<sup>12</sup> and reduced water security, with the largest adverse impacts observed in many locations and/or communities in Nigeria, and globally for Indigenous Peoples, small-scale food producers and low-income households. Between 2010 and 2020, human mortality from floods, droughts and storms was 15 times higher in highly vulnerable regions, compared to regions with very low vulnerability (high confidence) (IPCC, 2023, P5).

This excerpt from the Intergovernmental Panel on Climate Change (IPCC) 2023 report highlights the critical and urgent reality of human-caused climate change. The Earth's systems, including the atmosphere, oceans, cryosphere, and biosphere, have undergone significant changes due to human activities. These transformations have led to adverse effects, such as more frequent and intense weather events. Vulnerable populations—often those least responsible for climate change—are disproportionately affected. These include low-income households, small-scale food producers, Indigenous Peoples, and communities in Nigeria. Such groups face heightened exposure to climate hazards like droughts, floods, and storms, which have led to substantial losses and damages.

On the other hand, climate extremes are a major driver of food and water insecurity, particularly in Africa, Asia, Central and South America, and Small Island Developing States (SIDS). This is compounded by the interconnected vulnerabilities of humans and ecosystems. It shows that between 2010 and 2020, the mortality rate from climate-related disasters was 15 times higher in regions with high vulnerability compared to those with low vulnerability. This statistic underscores the urgent need for equitable climate adaptation measures. The report emphasizes that development constraints amplify vulnerability and limit the capacity of communities to adapt to climate-related hazards and with this, the feasibility of sustainable education in Nigeria is hampered (Olaniyi *et al*, 2013).

Rising sea levels and changes in precipitation patterns elevate the risk of flooding, particularly in low-lying coastal regions. Flooding can damage school infrastructure, including classrooms, libraries, and laboratories, and disrupt the continuity of education. Low-lying areas are susceptible to flooding, jeopardizing the functionality of school facilities and impeding the educational process (UNICEF, 2018). Similarly, increasing temperatures contribute to the degradation of building materials. Prolonged exposure to extreme heat can accelerate wear and tear on roofs, walls, and other structural components, necessitating more frequent maintenance and repairs. Rising temperatures contribute to the deterioration of building materials, impacting the longevity and sustainability of educational infrastructure (Haque & Davoudi, 2019).

Educational institutions, particularly in resource-constrained settings, often face financial challenges. Limited resources hinder the implementation of climate-resilient infrastructure measures, making schools more vulnerable to the impacts of climate change. Insufficient funds impede the ability of schools to implement necessary retrofitting and adaptation measures, leaving them susceptible to climate-related vulnerabilities (WRI, 2016). Moreover, lack of integration of climate change considerations in the planning and design of educational infrastructure contributes to vulnerability. Failure to account for changing climate conditions during construction can result in buildings ill-equipped to withstand future climate-related challenges (Nasir *et al*, 2013, Berrang-

Ford, 2015,). Vulnerability to climate change varies across regions. Schools located in environmentally sensitive areas, such as those prone to landslides or coastal erosion, face heightened risks. Urban schools, especially in densely populated areas, may encounter unique challenges associated with increased temperatures and limited green spaces (Pelling, 2015).

### **Curriculum Adaptation for Climate Change Education**

Education plays a pivotal role in preparing future generations to address the challenges posed by climate change. Curriculum adaptation is essential to integrate climate change education seamlessly into the educational system, fostering awareness, knowledge, and resilience. The integration of climate change education involves incorporating climate science concepts across various subjects. Science, geography, and environmental studies can serve as foundational platforms for understanding the scientific principles behind climate change. Embedding climate science concepts across disciplines provides students with a comprehensive understanding of climate change, enabling them to connect its impacts to diverse aspects of their education (UNESCO, 2018).

Climate change education emphasizes the development of environmental literacy, enabling students to comprehend the interconnectedness of human activities and environmental systems. This literacy is essential for informed decision-making and sustainable practices. Promoting environmental literacy equips students with the knowledge and skills necessary to make informed decisions that contribute to environmental sustainability (Stevenson, Peterson & Bondell, 2014).

Climate change education fosters critical thinking by encouraging students to analyze the complexities of climate-related challenges. Problem-solving skills are developed through exploring mitigation and adaptation strategies in response to real-world scenarios. Developing critical thinking skills empowers students to analyze climate-related challenges and devise innovative solutions, contributing to their overall resilience (Wals & Jickling, 2002; Elisha *et al.*, 2017).

Resilience skills include the ability to adapt to changing circumstances. Climate change education emphasizes the importance of adaptation, teaching students how to cope with evolving environmental conditions and uncertainties. Teaching adaptation and preparedness instills resilience, equipping students with the capacity to navigate and respond effectively to the impacts of climate change (UNESCO, 2018).

### **Role of Technology in Education Resilience**

In the face of climate change impacts and other challenges, technology plays a crucial role in enhancing education resilience. Leveraging innovative technological solutions not only facilitates continued learning but also builds adaptive capacities within educational systems. E-learning platforms offer a flexible and accessible way for students to engage with educational content. Platforms such as Moodle, Blackboard, and Canvas enable educators to deliver curriculum materials, assignments, and assessments remotely, fostering continuous learning regardless of physical disruptions. Online learning platforms provide a resilient means for educators to deliver content and engage students, mitigating the impact of disruptions to traditional learning environments (Al Lily, 2013).

The availability of digital resources and open educational content enhances resilience by providing educators with a diverse range of materials. Open educational resources (OERs) allow for the adaptation of content to local contexts and needs, promoting inclusive and sustainable education. Digital resources and open educational content contribute to the resilience of education by fostering adaptability and inclusivity in diverse learning environments (Atenas & Havemann, 2014).

Virtual classrooms and video conferencing tools, such as Zoom and Microsoft Teams, enable real-time interaction between teachers and students. These technologies replicate the classroom experience, fostering a sense of connection and engagement even in remote settings. Virtual classrooms and video conferencing technologies bridge the physical gap, providing a resilient solution for synchronous learning experiences in remote settings (Hodges *et al.*, 2020). The widespread use of smartphones allows for the development of mobile learning applications. These apps provide students with on-the-go access to educational content, supporting continuous learning irrespective of location or environmental disruptions (Chen, 2018).

## **Challenges and Opportunities in Climate-Resilient Education: Turning Obstacles into Learning Opportunities**

### **Challenges**

- i. **Limited Resources:** Many educational institutions, especially in developing regions, face constraints in financial and infrastructural resources for implementing climate-resilient education initiatives (Ebele & Emodi, 2016).
- ii. **Inadequate Teacher Training:** Teachers may lack adequate training and resources to integrate climate change education effectively into their teaching practices (Reid & Petocz, 2018).
- iii. **Climate Change Denial and Misinformation:** Resistance to climate science and misinformation can hinder the acceptance of climate education, especially in regions where skepticism is prevalent (Cook, 2016).

### **Opportunities**

- i. **Experiential Learning and Outdoor Education:** Leveraging experiential learning approaches and outdoor education can enhance students' understanding of climate change. Field trips, outdoor projects, and hands-on experiences connect theoretical knowledge to real-world situations, fostering a deeper appreciation for environmental issues (Rickinson, 2004).
- ii. **Community Engagement and Local Partnerships:** Involving local communities in educational initiatives creates a sense of ownership and strengthens resilience. Collaborating with community leaders, NGOs, and local businesses can enrich the learning experience and ensure that education aligns with community needs (Sterling, 2017).
- iii. **Integration of Technology:** Technology can provide innovative solutions for climate-resilient education. Virtual simulations, online platforms, and digital resources offer interactive and dynamic learning experiences, reaching a broader audience and fostering global collaboration (UNESCO, 2018).

## **Conclusion**

The challenges posed by climate change necessitate a fundamental transformation in the way we approach education. As we've explored the impacts of climate change on education infrastructure, the importance of climate-resilient education policies, and the role of international collaboration, it is evident that urgent action is required to build a sustainable future. Climate-resilient education stands as a linchpin in preparing present and future generations to navigate the complexities of a changing climate.

Climate change is no longer a distant threat; its impacts are felt globally, affecting ecosystems, economies, and societies. The urgency of addressing climate change in education is underscored by the escalating frequency of extreme weather events, rising sea levels, and disruptions to communities. The consequences for education are profound, with vulnerable populations and educational infrastructure bearing the brunt of climate-related challenges. As highlighted by the Intergovernmental Panel on Climate Change (IPCC), the window of opportunity to mitigate the worst impacts of climate change is narrowing rapidly (IPCC, 2021). The urgency lies not only in reducing greenhouse gas emissions but also in building resilience and adaptability within educational systems to cope with the inevitable changes.

## **Recommendation**

Addressing climate change requires a collective effort that extends beyond the boundaries of nations and encompasses various stakeholders. Governments, educational institutions, communities, Non-Government Organizations (NGOs), and global organizations all share a collective responsibility for fostering a sustainable future. This responsibility involves:

- i. Policy Advocacy and Implementation:** Government at all levels must champion climate-resilient education policies and allocate resources for their effective implementation. These policies should prioritize climate education integration, teacher training, and the development of resilient infrastructure.
- ii. International Collaboration:** Global collaboration is essential for knowledge exchange, resource mobilization, and the development of best practices. International organizations, such as UNESCO and the World Bank, play a crucial role in providing technical support, funding, and guidance for climate-resilient education initiatives.
- iii. Community Engagement:** Local communities are at the forefront of climate impacts, and their engagement is vital. Initiatives that involve communities in decision-making processes, education programs, and sustainable practices contribute to building resilience from the ground up.
- iv. Innovation and Technology Integration:** Embracing innovation and leveraging technology in education can enhance the effectiveness of climate-resilient initiatives. Virtual learning platforms, interactive resources, and digital tools enable dynamic and engaging educational experiences.

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