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Rebuilding Ecological Literacy: Environmental Education Strategies in Post-Conflict Somalia

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Abstract

The most severe environmental concerns facing Somalia are soil erosion, droughts, and climate change. These issues not only undermine the country's socio-economic stability and human security but also perpetually alter the political landscape, resulting in greater food scarcity and social conflict. The purpose of this study is to design Somalia's post-conflict environmental education (EE) policies that improve ecological literacy. The study focuses on gaps in the implementation of EE, such as lack of trained teachers, inadequate community involvement, and insufficient integration into curriculum, as its gaps through a qualitative analysis in literature review. It showcases the need for active involvement alongside multi-disciplinary frameworks, community collaboration, integration with central policies like the National Climate Change Policy. Challenges suggest the essential need toward formal

education which refers to school-based learning systems, non-formal education which encompasses community initiatives that fall outside the traditional classroom setting, and informal learning. The study further suggests the inclusion of technology to broaden the reach of EE materials, alongside targeted conflict-sensitive approaches to address underlying the tensions. The main suggestions from the study's findings is noted as improving eco literacy through comprehensive and multidisciplinary EE initiatives.

Key words: Environmental Education, Strategies, Somalia

Introduction

Promoting ecological literacy in post-conflict countries is essential because it leads to sustainable development, enables communities, promotes peace, and lowers the possibility for tensions over natural resources to escalate into conflict. In post-conflict societies, ecological literacy is directly related to the improvement of natural resource governance and management. This means, for example, that water governance reform can create a stable environment that enables sustainable practice. The researchers have pointed out that it is imperative to focus on educational structures that deal with ecological issues in order to create peace (Makki & Iftikhar, 2021). As noted by Swain, the link between water resource management and peacebuilding illustrates how the restoration and management of water resources can enable stability and sustainability in post-conflict areas (Swain, 2016). Water is vital to people's existence, but can also be the source of conflict, thus teaching ecological literacy regarding these aspects is important in the development of a peaceful society.

Additionally, environmental education can provide community members with the ability to adopt sustainable practices that tackle both post-conflict recovery requirements and enhance their resilience to future conflicts. The effective environmental governance arrangements will help local self-governance to build peace (Fauchald, 2021). Environmental peacebuilding—defined as collaborative resource management practices—can have communities shift focus from competition to cooperation and therefore 'reduce tension around environmental resources that become scarce (Dresse et al., 2018). Recognizing environmental changes, and their influence and implications, is critical for sustainable peace and for the future prospects of development work (Nardi & Runnström, 2024). This indicates that

development of ecological literacy contributes not only to the capacity of individuals, and therefore their community's capacity, but also allows them to work collectively to sustain ecological balance and in a positive manner support post-conflict recovery.

In addition, including ecological literacy program in a wider educational program can help support a transformation learning process that encourages critical thinking around the relationships among humans and the environment in a post-conflict situation. The participation in educational program h community participation and ownership of sustainability initiatives (Rugamba & Njenga, 2023). Teaching women about sustainable practices can have a multiplier effect on rebuilding efforts and improving community resilience because they are essential in managing households and local ecosystems (Rugamba & Njenga, 2023).

Somalia has faced a multitude of challenges in the previous years because of conflict and environmental degradation. Not only has the civil unrest destroyed the socio-economic status of the country, but the lengthy conflict has also significantly contributed to environmental challenges like deforestation, soil erosion, and biodiversity loss (Fauchald, 2021). The instability and insufficient governance of natural resource management have undermined ecological niches and created a volume of work, that requires ecological perspectives, to build resilience after a conflict. Thus, boosting ecological literacy in Somali communities is vital, to give them the societal literacy of knowledge and skill to deal with the issues and concerns associated with environmental degradation (Anwar et al., 2023).

Environmental literacy involves an individual's knowledge of ecological ideas, the human-environment interaction, and the impact that individual and group actions have on ecological systems (Anwar et al., 2023; Sunaryati et al., 2022) Environmental literacy is especially relevant

to Somalia's context, where environmental education (EE) can provide citizenry with knowledge to be able to make sustainable choices and develop pro-environmental behaviours. The environmental education can develop not only ecological awareness but also critical thinking and problem solving skills in relation to complex ecological problems (Jordan et al., 2008; Morrone et al., 2001). By utilizing environmental education as part of community actions, there is potential to produce a generation of citizens in Somalia capable of engaging with ecological issues.

According to Tidball and Krasny (2011) and Prastiwi et al. (2019), incorporating EE into school curricula can help young people develop an ecological understanding and change their behavior in a way that is beneficial to the environment. Because students are more likely to connect with content that is relevant to their lived experiences, knowledge-based strategies that are in line with local ecological contexts can improve the efficacy of educational programs (Pitman & Daniels, 2016). Furthermore, since involved communities are more likely to support sustainable practices and policies, encouraging community involvement in environmental initiatives can strengthen learning (Durmuş & Kinaci, 2021). Therefore, developing ecological literacy in post-conflict Somalia through organized and contextualized teaching methods offers a way to support sustainable development and environmental resilience.

Somalia faces a series of environmental conflicts that threaten its socio-economic stability and human security: severe soil erosion, droughts, and climate change, all worsened by the backdrop of political instability and weak governance. A spatial assessment by Nur et al. shows that about 39.56% of the southern regions face high soil erosion, while 61.36% of land is completely dry, thus further aggravating the plight of agricultural distress and food insecurity (Nur et al., 2024).

Political factors further complicate resource management (Ahmed et al., 2024), while Ulusow and Abdi have pointed out that environmental changes render vulnerable communities unstable, necessitating resilience (Ulusow & Abdi, 2024). Further urban development and poor governance aggravate environmental degradation (Hussein et al., 2024), while renewable energy initiatives could oppose these effects (Osman et al., 2024). This cooperative endeavor could potentially uplift peacebuilding via the practices of sustainability. (Kheira, 2024).

Problem Statement

Somalia faces deep environmental challenges, including in particular, soil erosion, droughts, and also climate changes, which, along with political instability and weak governance, undermine socio-economic stability and human security. Lack of ecological literacy may hinder managing resources properly by transforming them into food insecurity and social tension (Nur et al., 2024; Ahmed et al., 2024). These issues need to be reversed by designing and implementing appropriate environmental education programs that rebuild ecological literacy and actually empower the communities to engage in sustainable practices toward resilience and socio-economic development. The study aims to formulate effective environmental education strategies to promote ecological literacy in post-conflict Somalia. The findings of the study will help policymakers, educators, and community leaders who want to promote resilience and sustainable development in fragile environments by examining successful environmental education strategies in Somalia.

Related Work

Conceptual Foundations of Environmental Education

During the Tbilisi Declaration, drafted and composed in 1977 at the First International Conference on Environmental Education, UNESCO,

and UNEP considered it a landmark seat from which environmental education (EE) must advance awareness and responsible behaviors. It has the view that in a proper understanding of environmental problems, knowledge develops in all areas and along the social, cultural, ethical, and economic dimensions. This approach intends to develop individuals with a strong will to engage in sustainable activities for future generations (Busi et al., 2023). We can see that the declaration laid the foundation for the formation of global frameworks such as Agenda 21 promoting incorporation of EE into all levels of education and working together with various stakeholders, including local communities (Wake & Eames, 2013; Lotz- Sisitka, 2009; Dawson et al., 2021). Moreover, its vision parallels further developments in education whereby digital technologies are employed for promoting EE and achieving sustainability goals (Butler et al., 2018), fostering critical thinking and engaging students in transformative learning processes (Thomas, 2009). The Tbilisi Declaration basically states that education systems everywhere must be molded for the birth of ecological literate citizens who are able to face the pressing challenges (Aramesh, 2019).

The Environmental Education can be further categorized into three types: formal, nonformal, and informal, each for its purposes or different needs. According to Dib (1988), formal education is in a structure, all being framework for vocational preparation, and therefore is given in fixed institutions like schools or universities. It develops one's thinking and civic engagement internally through set curricula (Mohammad et al., 2020; Witschge et al., 2019). Non-formal education, on the other hand, is a flexible framework that can fulfill the practical skills of very targeted groups, hence making them into empowered communities (Widaningsih & Abdullah, 2016; Windarsari et al., 2017). Informal is considered to be anything that goes on outside schools; it concerns the transmission of moral and social values through everyday experiences and interaction

(Sa'diyah et al., 2021; Sheffield, 1972). Together, these types create a continuum of learning experiences, allowing individuals to transition among them based on their needs, thereby informing better educational policies and practices.

UNESCO's Framework for EE

UNESCO's approach to the Education for Sustainable Development constitutes multiple foundational documents, starting with the 1977 Tbilisi Declaration and continuing with the 2014 Global Action Program (GAP) on ESD. These documents develop a framework for environmental education (EE), emphasizing components such as awareness and knowledge, attitudes and values, and skills and participation. The Tbilisi Declaration situates ecological understanding as primary to awareness and knowledge, whereas the GAP brings forth certain arrangements to strengthen educational processes for fostering environmental ethics and practical problem-solving abilities with respect to concrete environmental issues among learners (Brunold & Ohlmeier, 2022; Mochizuki, 2016).

The development of attitudes and values is significant, as these determine how learners look at environmental issues. The education strategies emanating from the GAP aim to nurture the sustainable mindset such that people, when confronted with complicated ecological issues, shall deal with them from the appropriate ethical perspective (Mochizuki, 2016; Mochizuki & Bryan, 2015). In addition, integrating skills and participation further clarifies the will of the program to ensure that learners are equipped with the necessary instruments for active participation and contribution to sustainability efforts (Mochizuki & Bryan, 2015; Sipos et al., 2008). This triad of awareness, attitudes, and skills permeates the range of various national curricula, including Rwanda's Competence-Based Curriculum, intended to impart these

competencies to learners within an educational setting (Keryan et al., 2020). Further contextualizing the implementation of these frameworks, one can observe the concord between ESD principles and contemporary educational approach. Many educational institutions have adopted pedagogies facially aligned with UNESCO's ideals to foster an interdisciplinary methodology and critical inquiry among students. Ecological-based programs also motivate pupils to engage in community projects, which, in mirroring the aspirations outlined by the Tbilisi Declaration and GAP, stimulate active learning (Brunold & Ohlmeier, 2022; Sterling, 2014). The building of these principles, from the establishment of the Tbilisi Declaration up until their ultimate expression in the Global Action Program, represents a transformational journey aimed at empowering young generations through the medium of education (Brunold & Ohlmeier, 2022; Mochizuki, 2016).

Tbilisi Principles

Coming into existence by decision of the UNESCO and UNEP Intergovernmental Conference held in Tbilisi in 1977 in Tbilisi, Georgia, the Tbilisi Principles for Environmental Education determine some essential pillars that have profoundly influenced the worldwide approaches to EE. Mainly, they are based on five essential pillars: interdisciplinary approach, lifelong learning, local and global perspectives, active participation, and thinking critically and solving problems. The first pillar emphasizes that environmental education must be integrated into different subject areas so that they become more relevant to the problems that learners are supposed to address and prepare learners in confronting these complex environmental issues in a comprehensive manner. In support of this, the Tbilisi principles further advocate that learners, throughout their formal education, must be engaged in environmental education that promotes cooperation from

various disciplines (Chen & Martin, 2014; Demir & ÖTELEŞ, 2023). The second pillar pays attention to the notion of life-long learning, assuming that environmental education should go beyond the formal education and include other spheres of education such as informal and non-formal arenas, in that education is viewed as a process that goes on and requires constant renewal of engagements with environmental issues (McNeill, 2020). The third pillar underlines the necessity for environmental problems to be understood both locally and globally, thereby arguing that local interventions carry some global implications and for a contextual education that strikes a harmony with learners' own experiences as well as connects them to global issues (Sarabhai et al., 2012). The fourth pillar is participation, which involves networks of individuals and of communities engaging in the shaping of environmental decisions and, hence, taking ownership and responsibility for environmental concerns, with this concept fitting in with ideas of democratic participation and collective activities toward sustainability (Stevenson, 2006; Reid et al., 2021). Finally, persons must be capable of critical thinking and problem-solving skills in order to make good decisions in addressing the various environmental problems. Therefore, the Tbilisi principals indicate educational approaches encouraging critical thinking and innovative problem-solving so that students can transform into active agents of change in their community (Filho & Pace, 2016; Thomas, 2009; Gough, 2001).

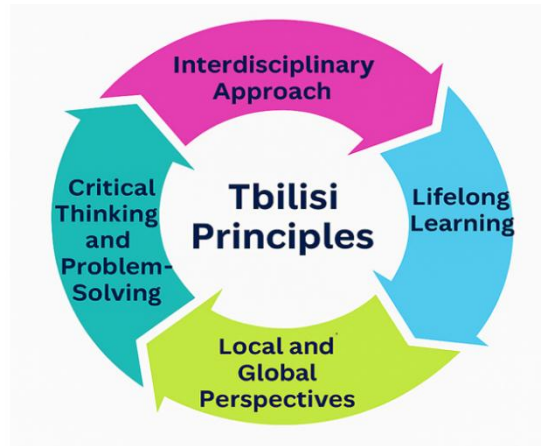
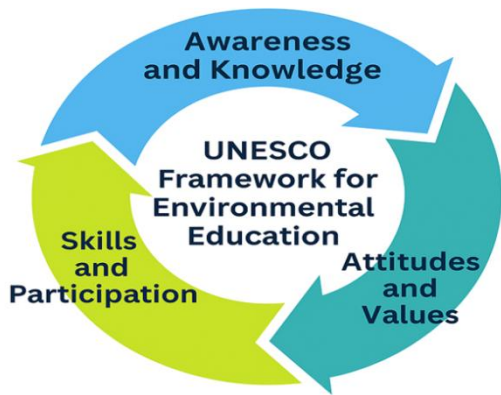


Figure 1. Conceptual and Theoretical Framework

Effective Interventions

Environmental education is all about educating and raising social and psychological awareness about environmental issues and imposing constructive attitudes. Its effectiveness is divided into three major categories: by school, by community, and by policy and governance frameworks.

School-Based Approaches: School-based initiatives help develop environmental awareness in students. Studies show that the inclusion of sustainability in education can greatly increase not only students' knowledge but also their attitudes toward environmental stewardship and intent to act on behalf of environmental issues. The regular reinforcement of sustainability concepts within an educational program largely influences students to see through environmental issues and behave responsibly (Taboada-González & Aguilar-Virgen, 2024; Nurlila & Fua, 2022). Moreover, the existence of Green Schools enhances student wellness and environmental engagement, thus underscoring the connection between psychological factors and educational outcomes (Kerret et al., 2014; Perera et al., 2024). Preparation provided to the

teacher to conduct these programs determines the performance of the program. Studies emphasize the fact that the knowledge level and attitude of teachers with respect to EE are of paramount importance for the success of program implementation (Liao et al., 2022). Once the teacher feels confident about methods of environmental education, students tend to become more involved and learn better (Scott & Sulsberger, 2019). Workshops for pre-service teachers have also been deemed to help them in improving their capacity to effectively teach environmental issues (Scott & Sulsberger, 2019; Lee & Kim, 2017).

Community-Based Strategies: Community-based methods apply EE tenets into broader societal domains promoting collective intervention for sustainability. These programs heavily borrow from experiential learning, allowing participants to deal directly with local environments for sustainability challenges. Using local resources for educational purposes has helped in increasing environmental awareness and skills amongst community members (Tadena & Salic-Hairulla, 2021).

The community engagement program raises awareness and induces behavioral change by giving people the opportunity to take action on a local environmental matter (Nurfitria et al., 2022). It is important to include relevant stakeholders like local governments and organizations to these programs so that resources can be shared and collaborative conservation efforts (Obasi & Osah, 2022).

Policy and Governance: Policy and governance frameworks are significant actors in delineating the scope of environmental education. Good governance can foster an appropriate environment for EE by putting in place policies encouraging sustainability within the education systems. Hence, a well-articulated policy will bring improvements in curriculum development and educational practices at different levels (Mohamoud et al., 2020). Furthermore, policies providing incentives for

partnerships between educational institutions and government agencies can improve the delivery of sustainability projects, which integrates educational objectives with wider environmental objectives (Nurlila & Fua, 2022; Simionescu et al., 2020). The incorporation of EE into education policies may further serve in bringing about a cultural change toward sustainability. Such policies should specify benchmarks and keep track of the progress made; thus, environmental education remains a core part of academic life and is not sidelined as an extra subject (Obasi & Osah, 2022).

Environmental Challenges in Somalia

Environmental issues in Somalia revolve around climate change, biodiversity loss, and land degradation and their socio-economic and ecological implications. Being a country prone to climate shocks such as extended dry spells and heavy floods, the shocks interrupt agriculture and water resources, thereby worsening food insecurity and displacing millions (World Economic Forum, 2023; London School of Hygiene & Tropical Medicine, 2025). Approximately 3.9 million people are said to be currently displaced due to environmental factors, demonstrating the intensity of climate change in Somalia (London School of Hygiene & Tropical Medicine, 2025). The degradation of livelihoods, especially among 65% of its population dependent on agriculture and livestock, leads to a sharp increase in poverty and health risks related to air and water pollution (Forced Migration Review, 2014). This can be seen as a factor complicating the socio-economic landscape through the worsening of coastal ecosystems, illegal fishing, and pollution, emphasizing the linkage between environmental degradation and the questions surrounding community resilience (Forced Migration Review, 2014). In the face of such escalating issues, the Somali government has attempted to put various policies into place to improve environmental governance,

such as the National Environment Policy (2019) and the National Climate Change Policy (2020), although the improved governance and institutional capacity to enable these policies remain in doubt, putting the resource management and accountability in fight to cure environmental degradation at the forefront (World Economic Forum, 2023). The primary idea that lies at the center of the environmental problems in Somalia is that it is a multidimensional crisis of socio-economic nature coupled with governance challenges and climate change effects. Resolution of these problems must require the costly interventions from these actors: government, local communities, and international community to build resilience and adopt sustainable development measures. (London School of Hygiene & Tropical Medicine, 2025; Harvard University Center for International Development, 2024). Key initiatives include the ministry's establishment in 2022, the National Climate Change Policy in 2020, intended to parallel climate adaptation with national development plans. Community-driven projects such as afforestation, sand dams, and sustainable agriculture seem promising in terms of raising resilience and livelihood (UNDP Somalia, 2024). The challenges still remain, including political instability, deficits of funds, and conflicts arising from resources (Ministry of Environment, 2024). The continuous climate shocks displace millions, aggravate food insecurity, and raise competition for scarce resources (Ministry of Environment, 2024). Joint governance and community-based adaptation integrated with modern technologies would provide the best way forward for building lasting resilience (Berghof Foundation, 2024). For environmental programs in Somalia to succeed, it will be vital to deal with the underlying conflict issues and invest in building the capacity locally, along with ensuring sustainable financing (Fuelling the Flames, 2023).

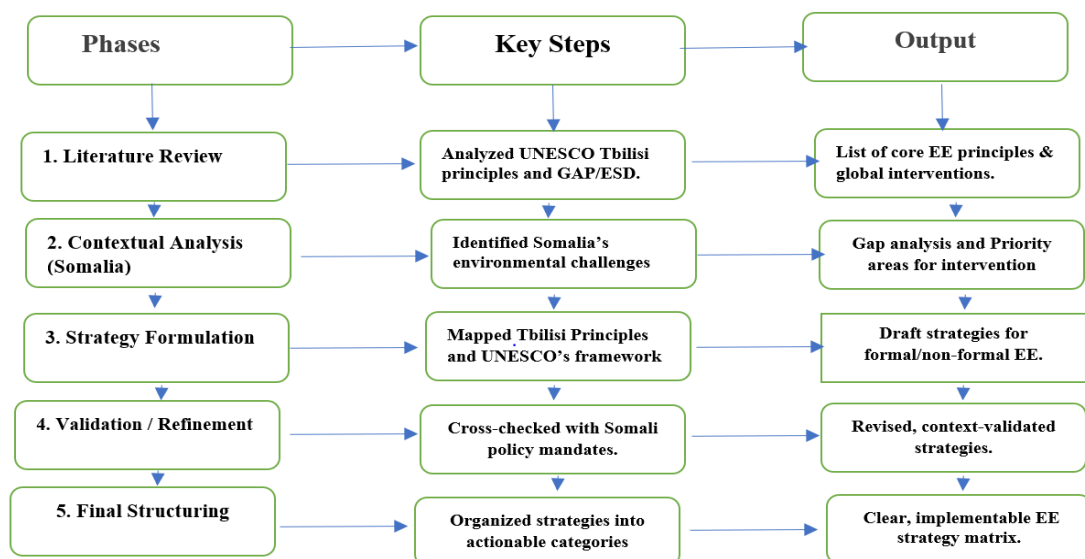
Table 1. Gaps in Environmental Education Implementation in Somalia

Gap Category	Specific Challenges	Literature Support
Policy & Governance	- Lack of enforcement of existing policies (National Climate Change Policy 2020). - Weak institutional coordination between ministries and local actors.	"Ineffective governance and lack of resources undermine initiatives" (World Economic Forum, 2023).
Formal Education	- EE not systematically integrated into school curricula. - Shortage of trained teachers in environmental topics.	"Teachers' knowledge and awareness of EE are crucial for successful implementation" (Liao et al., 2022).
Community Engagement	- Limited participatory approaches in environmental programs. - Underutilization of indigenous knowledge in conservation.	"Community engagement not only raises awareness but also fosters behavioral change" (Nurfitria et al., 2022).
Conflict Sensitivity	- EE programs do not adequately address resource-based conflicts. - Displacement due to climate shocks is overlooked in education.	"Climate shocks continue to displace millions and worsen resource competition" (Ministry of Environment, 2024).
Funding & Resources	- Insufficient investment in EE initiatives. - Lack of monitoring and evaluation frameworks.	"Funding gaps persist, limiting program scalability" (Berghof Foundation, 2024).

Methodology

This research uses qualitative method to analyze environmental education literature for developing appropriate strategies which support Somalia's recovery post-civil war period. The process for creating Somali Environmental Education (EE) strategies used systematic steps based on

the UNESCO Framework and Tbilisi Principles (see flow chart 1). The literature review identified Tbilisi Declaration and UNESCO's Global Action Program as key frameworks which guided the formulation of steps based on Tbilisi principles and UNESCO's triadic framework to focus on awareness and attitudes and skills followed by thematic analysis of successful EE interventions worldwide including school-based and community strategies. The strategies for implementation adapted to Somalia's context through examination of its environmental problems together with policy deficiencies (table 2).



Primary Source (2025)

Flow chart 2. Phases and Steps for developing Somali Environmental Education (EE) strategies.

Table 2 presents different approaches for EE implementation in Somalia as formal education along with non-formal and community-based programs and policy and governance and technology and innovation and conflict-sensitive approaches. The activities encompass

interdisciplinary curriculum development and community workshop facilitation and national policy harmonization and digital tool awareness campaigns and resource conflict resolution. The strategies align with UNESCO/Tbilisi principles by focusing on environmental education to enhance environmental literacy, promote community development and institutionalize climate-resilience efforts.

Table 2. Initiative Strategies for Somali Environmental Education

Strategy Category	Key Actions	Alignment with UNESCO/Tbilisi Principles	Expected Outcomes
1. Formal Education Integration	– Develop interdisciplinary EE curricula. – Train teachers in EE pedagogy. – Establish "Green Schools" with sustainability projects.	– Tbilisi Principle: Interdisciplinary & lifelong learning. – UNESCO GAP: Awareness & skills development.	– Increased environmental literacy. – Schools as hubs for sustainability practices.
2. Non-Formal & Community-Based EE	– Conduct workshops via radio/ local leaders. – Promote hands-on training (e.g., sand dams, agroforestry). – Integrate indigenous knowledge.	– Tbilisi Principle: Local/global perspectives & active participation. – UNESCO: Community engagement.	– Empowered communities adopting sustainable practices. – Preservation of traditional ecological knowledge.
3. Policy & Governance	– Align EE with National Climate Change Policy. – Strengthen MoE-Environment Ministry collaboration. – Monitor EE program impacts.	– Tbilisi Principle: Systemic approach. – UNESCO GAP: Policy coherence & institutional support.	– Institutionalized EE in national planning. – Accountability in environmental programs.
4. Technology & Innovation	– Use mobile/radio for EE awareness. – Introduce GIS for environmental monitoring. – Digital platforms for teacher training.	– Tbilisi Principle: Critical thinking & problem-solving. – UNESCO: Digital transformation of ESD.	– Wider reach in remote areas. – Data-driven environmental management.
5. Conflict-Sensitive EE	– Teach resource conflict resolution. – Link EE to livelihood programs (e.g., solar energy).	– Tbilisi Principle: Ethical dimensions. – UNESCO: Socially transformative education.	– Reduced resource-based conflicts. – Youth engagement in climate resilience.

Conclusion

The research demonstrates environmental education (EE) as an essential part to solve major ecological problems especially in Somalia. The Tbilisi Declaration (1977) together with UNESCO's Global Action Program sets essential guidelines which stress complete knowledge of environmental matters through social and cultural as well as ethical and economic perspectives. The categorization of EE into formal, non-formal, and informal types reveals the diverse education needs and experiences for fostering environmental literacy. The successful implementation of educational initiatives requires school-based approaches along with community-based methods to build understanding about sustainability while promoting active sustainability practices. Somalia's environmental difficulties become worse because of climate change together with weak governance structures that prevent successful EE implementation. The effectiveness of EE initiatives depends on solving three major issues which involve policy enforcement gaps and curriculum integration problems and community participation deficiencies. The recommended approach involves creating multi-disciplinary school content together with local community participation and national policy alignment and technological methods to increase participation and reach wider audiences.

Recommendations

To effectively advance Environmental Education (EE), a multi-faceted approach is essential. First, it is crucial to systematically develop interdisciplinary curricula and incorporate them into the formal education system at all levels to ensure standardized learning. Concurrently, teacher training and capacity must be enhanced through comprehensive programs that build pedagogical skills and content knowledge, fostering educator

confidence and competence. Furthermore, EE initiatives should actively promote community-based and participatory approaches by engaging local populations and empowering them to apply their traditional environmental knowledge to practical conservation efforts. To ensure effectiveness and coordination, these initiatives must be formally aligned with national policy frameworks, such as the National Climate Change Policy, creating a unified implementation strategy. Expanding access is also critical, necessitating the leverage of digital tools and mobile learning platforms to extend resources and training to remote and underserved areas. Finally, all programs should adopt a conflict-sensitive design to ensure they remain relevant and effective by directly addressing local resource-based conflicts and climate-induced displacement.

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