Integration and effectiveness of formal environmental education in Africa and India: Review

Tsegay Kahsay Gebrekidan [1]* 🆔 , Gebremariam Gebrezgabher Gebremedhin [1] 🆔

[1] Department of Environmental Science, Adigrat University, Tigray, ETHIOPIA
*Corresponding Author: tsegay122008@gmail.com

ARTICLE INFO	ABSTRACT
	Increasing environmental awareness, knowledge, attitudes, and motivation to address environmental challenges and improve the environment are the main goals of environmental education (EE). Using a goal-based, process-based education evaluation model and parameters like the integration of EE in environmental policy, the potential rich environmental content of the curriculum, and education about, in/through, and for the environment using secondary data, it was possible to evaluate the effectiveness of EE. With the exception of India, the legal evolution of EE across Africa, particularly after the Earth Submit Declaration, has been similar and attempted to be incorporated at the legislative level. In India and Tanzania, where EE is about, in/through, and for the environment practiced, it is integrated into the curriculum at all grade levels. These countries also tried to promote indigenous knowledge and practical-based education on local and global environmental aspects. Whereas in Ethiopia, in lower grades, EE is about the school and little in/through the environment and hardly for the environment, in South Africa, there is hardly any structured, harmonized, and effective practical implementation of EE. Due to fewer government concerns, generalized integration, a lack of a well-written strategy, and financial and technological constraints, EE in Africa is not applied, is ground-based and is ineffective. Therefore, it should incorporate EE in all subjects at all school levels and needs further study on the effectiveness of EE. **Keywords:** active engagement, environmental protection, implementation, practical-based school curriculum

INTRODUCTION

According to Afrik (1984) and Omari and Baser (2014), education is a process of learning, teaching, facilitating, training, and instructing that aims to create, develop, and improve knowledge, skills, and attitudes, encourage the development of competencies, and allow a person to change for the better. It is a process of learning to know, learning to do, learning to be, and learning to live together in harmony with others (Delors, 1996; Elfert, 2019; Silva & Sá, 2018; Suhifatullah, 2022; UNESCO, 2019).

Environmental education (EE) is a process that helps people become more conscious of the environment and the issues that are related to it (Khademi-Vidra, 2017). It also offers a comprehensive approach to improving and growing abilities for resolving contemporary environmental issues, safeguarding the environment, and preserving environmental resources for the next generations (OECD, 2018, 2019; UNESCO, 2019, 2020); a comprehensive strategy to achieve environmental protection goals by strengthening people's environmental sensitivity, knowledge, attitudes, abilities,

values, and incentives to enhance the environment (Elfert, 2019; Lotz-Sisitka et al., 2016; OECD, 2018, 2019; Silva & Sá, 2018). Different scholars also describe EE as an education in, about/through, and for the environment (Abraham, 2013; Elfert, 2019; OECD, 2018, 2019; Silva & Sá, 2018; Suhifatullah, 2022; UNESCO, 2020; Yeshalem, 2013). For sustainability and environmental security, create a robust system of EE that considers human reactivity to the natural world (Lotz-Sisitka et al., 2016). To implement this, the United Nations and other nations are actively pursuing this strategy to foster social cooperation (Keong, 2020; OECD, 2018; UNESCO, 2019; Yadav et al., 2022). In this regard, several global projects, including community development efforts and awareness campaigns, are underway in several nations (UNESCO, 2019, 2020).

The goal of education for sustainable development (ESD) is to accelerate the implementation of sustainable solutions at the local level while strengthening ESD and impeding the achievement of all of the millennium sustainable development goals. Priority action should be given to developing policies, transforming training and learning environments, developing the capacities of educators and trainers, mobilizing youth, and

developing ESD to create a more just and sustainable world by 2030 (UNESCO, 2019, 2020).

EE is generally understood to be a methodology, a philosophy, a tool, and a profession that is utilized to further the following three objectives: The objectives are, as follows:

(1) to raise awareness of the interdependence of economic, social, political, and environmental resources in urban and rural areas,

(2) to provide equal opportunities for all individuals to acquire the knowledge, values, attitudes, commitment, and skills necessary to solve environmental problems and improve the quality of the environment, and

(3) to develop and improve the behavior of individuals, groups, and society at large toward the protection of the environment (OECD, 2018; UNESCO, 2019, 2020).

The present understanding of the environmental challenges around the world gives rise to EE (UNESCO, 2004). Principle 19 of the United Nations Conference on Human Environment, held in Stockholm in June 1972, states that EE should be provided to children and adults in formal education settings as well as through informal learning settings (UNEP, 1992).

The basic goal of EE, as stated in the recommendation section of the international conference on EE held in Tbilisi in October 1977, is to improve people's understanding of how complex the natural and built environments are as a result of the interaction of biological, physical, social, economic, and cultural aspects and to help people develop the knowledge, values, attitudes, and practical skills to participate responsibly and effectively in these environments (Yeshodhara & Naia, 1998). Following 1977 Tbilisi Declaration, the Rio De Janeiro Declaration (1992) with Agenda 21 policy urged all governments to integrate EE across the entire school curriculum. As a result, many nations around the world have developed and adopted education policies aimed at EE integration into the school curriculum to develop EE objectives and improve the environment (UNEP, 1992).

By 2025, UNESCO (2020) recommends that all nations include EE as a mandatory part of their school curricula. Because protecting the environment is one of the fundamental foundations of achieving sustainable development, EE is now recognized on a global scale (Bhat et al., 2017; Laiphrakpam et al., 2019).

Students are supposed to study environmental issues, how to care for the environment, and develop the skills and drive to diminish present environmental challenges as EE is a part of the curriculum (Laiphrakpam et al., 2019); and plays a crucial role in providing information to the younger and grassroots generations, creating cognitive frameworks for comprehending natural world issues, thinking, and interpreting environmental problems, and establishing fundamental awareness, skill, knowledge, and attitude to begin contributing to the solution of local environmental problems (Ardoin & Bowers, 2020; Khademi-Vidra, 2017; Nath, 2009; Yadav et al., 2022).

In most African countries, integrated curricula are found mostly at the lower levels of education (Lotz-Sisitka et al., 2016). Integrated curricula have been established throughout

the world. Because of this, many academics have advised that the administration of the school and those in charge of setting educational policy should support and develop an integrated approach to EE by putting the school's EE policy into practice (Damoah & Adu, 2020; Gunjan Verma, 2017; Lotz-Sisitka et al., 2016; Yanniris, 2021). The school's EE strategy must be planned and implemented with an integrated approach (Loubser, 2005). Children act as catalysts for promoting environmental knowledge, attitudes, and behaviors in their parents and throughout their communities (Duvall & Zint, 2007). This is because all policymakers, administrative leaders, and the people who matter in influencing decisions in the community pass through the school and college systems.

Yeshodhara and Naia (1998), recommended that basic environmental issues be included in all university courses of study as well as the integration of local and global environmental knowledge with all disciplines at all educational levels. EE places a strong emphasis on practical rather than theoretical learning and uses Environmental Knowledge as a test for entry into colleges, universities, and various competitive examinations at the state and federal levels. Similar to Lotz-Sisitka (2011) who highlighted the need for the school's EE policy to be advantageous, feasible, and acceptable to the administration, parents, teachers, students, and the local community. Schools should create their rules in response to the unique requirements of their institution, the surrounding area, and the local community. According to Damoah and Adu (2020), Lotz-Sisitka (2011), and Lotz-Sisitka et al. (2016), the capacity of teachers to teach EE is developed through the development of a curriculum with clear goals and content and specific guidelines.

A fundamental problem is the need to emphasize integrating EE and capacity building into curricula at all levels of the educational system and giving curriculum developers more power (Lotz-Sisitka et al., 2016). To ensure behavior change and policy influence, as well as the development of an environmentally aware citizenry, teachers' competencies, and capacity building play a crucial role in the implementation of EE (Damoah & Adu, 2020; Lotz-Sisitka, 2011; Lotz-Sisitka et al., 2016). Additionally, to raise students' understanding of the environment, effective environmental regulations in every school must be considered (Barraza, 2001).

Furthermore, successful EE programs ought to be founded on reliable sources, conventional wisdom, or science, claim (Thomson et al., 2003); Create knowledge and understanding of ecological, social, economic, and political concepts and show how a healthy environment, human well-being, and a strong economy are interdependent; grounded in a real-world context that is specific to age, curriculum, and place; and promote a personal connection with the earth through hands-on outdoor activities and the practice of an ethic of care; Encourage the learner to build a sense of commitment to contributing to the creation of a sustainable home, community, and planet, among other things, by fostering knowledge of the past, a sense of the present, and a positive vision for the future.

Therefore, the aim of this review was to evaluate the integration, and effectiveness of formal EE in Africa (Ethiopia, South Africa, and Tanzania) and India; using the goal-based, and process-based EE evaluation model and parameters. This

review will be clearly show for the readers, policy makers, decision makers, and scholars(researchers) the positive improvement, and development of EE in each country, and the gap that will need at policy or implementation amendment.

METHODOLOGY

Because of their comparatively high levels of environmental protection concern, training to integrate EE into school curricula, and informational accessibility, Ethiopia, Tanzania, South Africa, and India were selected for this study. The documents that online search were limited to English. The data presented in this study was based on secondary sources that published after 1990, which EE was modernized and international agenda, and it attempted to address a wide range of secondary documents, including unpublished theses, governmental documents such as the constitution, policy, proclamation, guidelines, curriculums, and strategies, as well as published conference reports from around the world, books, published and unpublished articles, keynotes, notebooks, and other materials found through internet searches of the chosen counties.

The methodology for this analysis is a synopsis of systematic evaluation and assesses the effectiveness of formal EE in schools in the chosen countries using the parameters developed by Thomson et al. (2003) using EE evaluation model (effectiveness, goal-based, and process-based), which was used by Stern et al. (2014) to assess EE programs in the new millennium, as well as the author's own analysis. Additionally, the author employed Yeshalem (2013) education about, in, though, and for the environment that was adopted to examine the efficacy and standard of EE as well as its delivery methods. Utilizing the qualitative description, comparison, and discussion ways of assessing and interpreting outcomes, this review was anticipated.

ENVIRONMENTAL EDUCATION ANALYSIS

Environmental Education in Ethiopia

EE policy frequently promotes the inclusion of the environment in development planning at all levels (Obol et al., 2003). Legally, Ethiopia began its formal EE after the 1992 Rio de Janeiro conferences and in 1995, sections 43, 44, and 92 of the Ethiopian constitution acknowledged environmental rights and obligations (FDRE, 1995). As a result, EE and awareness are included in part 4.10 of Ethiopia's environmental strategy (EPA, 1997). To stimulate the teaching of EE on a multidisciplinary basis and to incorporate it into the curricula of schools, colleges, and universities, but not to regard it as a distinct or supplementary subject,

(1) is how the issue of EE in environmental policy is stated,

(2) encourage the use of mass media for raising environmental awareness by gaining access to physical issues and communications,

(3) enhance the higher education and training facilities now in place by adding courses and programs on

environmental issues for various disciplines as well as specialized training in environmental professions,

(4) establish and support regional environmental organizations, groups, and initiatives that use the media to spread knowledge about the environment and nurture best practices, and

(5) non-governmental organization, local communities, and religious leaders should be encouraged to actively participate in environmental conservation and the spread of environmental consciousness (EPA, 1997).

Along with promoting the inclusion of multidisciplinary EE in school curricula, EPA (1997) developed a framework for inspection and monitoring within several layers of offices that operate at various levels to keep an eye on activities that are relevant to the environment. Additionally, non-formal EE develops at the city, institution, and school levels (especially through participation in environmental clubs) (EPA, 2002). However, practically speaking, there are no effective inspection and monitoring procedures, ground-based follow-up, or proper EE integrations in all grade cycle schools. The main goals of EE are described in the Ethiopian government's Education and Training Policy, which also outlines how to raise people who can responsibly manage resources and actively participate in protecting Ethiopia's environment, natural resources, and historical heritage (FDRE, 1994).

Environmental science has been designated as an independent subject that is primarily integrated with the natural sciences, health, agriculture, social sciences, home science, and civics education (MoE, 2009), and the lower grades (grade 1-grade 4) of the primary school curricula generally cover enough environmental-related topics and content (Husen, 2018). Whereas in the second cycle, primary (five-eight) and secondary schools are given a cross-curriculum approach in which a limited amount of environmental issues are incorporated in a few subjects only as topics or titles; however, the relative content of environmentally related issues are insignificant (Husen, 2018; MoE, 2009; Yeshalem, 2013), with restricted environmental content, a lack of dissemination of environmental information in the classroom, and an absence of field and problem-based teaching strategies (Semegne, 2007).

Additionally, the majority of teachers did not demonstrate a clear intention to connect their lessons to actual regional environmental issues, indigenous environmental knowledge, experiences and doable, problem-based environmental solutions. The integration of EE varied by topic and grade cycle in terms of coverage and strategy; it was rather substantially integrated in the lower primary school during the first cycle but less so in the upper primary and secondary schools (Husen, 2018; MoE, 2015; Waktola, 2009). Additionally, due to the issue with curriculum composition, there are not enough environmental professionals among college teachers (Waktola, 2009). The goals and objectives of EE cannot be met, according to Barraza and Walford (2002), Stern et al. (2014), and Thomson et al. (2003), by teaching students about the general environment without also providing them with reliable knowledge, skills, practical experience, goal-based, issue-based, and ground-based local environmental problems, as well as problem-based solutions. To help students acquire positive attitudes and pro-environmental behavior in and for

their local environment, disconnecting EE from local environment knowledge, ground-based, practical-based, and outside investigation is unsuccessful (Wolde, 2008; Yeshalem, 2013).

EE and environmental-related content are also provided in various environmental-related programs and specializations (like environmental science, environmental engineering, environmental health, environment and hydraulic engineering, environment, and geography, sustainable land management, etc.) in higher education, despite the fact that there is a significant gap and no uniformity among universities in the nation and students of different professional specializations (departments). Additionally, department of environmental science at numerous universities in Ethiopia (such as Addis Ababa University, Haremaya University, Jimma University, Wollega University, Wolayta Sedo University, Adigrat University, etc.) offers undergraduate and postgraduate courses that provide in-depth knowledge on environmental-related topics (Adamu, 2020; Kassaye, 2013; MoE, 2013, 2019; Teferra, 2013).

In a similar vein, a case study on the state of environmental programs at Addis Ababa University and Jimma University revealed that issues of sustainable development were covered in the strategic plan document, interdisciplinary teaching methods were used to develop EE-related curriculum disciplines for undergraduate students, and postgraduate students were well-versed in various programs and specializations at both universities. However, unlike the University of Pretoria in South Africa, those and other higher educational institutions in Ethiopia lack environmental policies and accountable coordinating directorates like HIV/AIDS and gender (Fisseha, 2008).

Environmental Education in Tanzania

The Arusha Declaration of 1967 emphasized the importance of EE in Tanzania, but it did not gain legal traction at the national level. However, similar to Ethiopia legally, EE was initiated following the Rio de Janeiro conferences to encourage public participation, recognize indigenous knowledge, and reorient towards sustainable development. This led to numerous sectoral policies, such as National Environmental Policy and Environmental Management Act (2004), National Land Policy (1995), National Higher Education Policy (1999), Science and Technology Policy (1996), Wildlife Policy (1998), etc., placing a strong emphasis on the requirement for EE. As a result, the Tanzanian Government's 1995 education and training policy included EE (Makundi, 2003; MoE&C, 1995; MoE&VT, 2010). Ministry of Education and Vocational Training produced similar recommendations for incorporating EE components into elementary school curricula in 2004 (MoE&VT, 2010).

Similar to Ethiopia's environmental strategy, Tanzania's national environmental strategy (NEP, 1997), encourages both official and informal education to reach a variety of stakeholders. In addition to the framework for an integrated approach to planning and sustainable management of the country's environment, it was upgraded and amended to provide a wide variety of measures and activities in response to important environmental issues and difficulties. However, it places less of an emphasis on formal EE as a primary concern

than Tanzania's previous environmental policy did (NEP, 2021). A public awareness campaign is given significant focus in Tanzania national environmental action plan (NEP, 2021) as part of the management of natural resources as a prerequisite for sustainable development. It also listed the main dangers to Tanzania's natural resources, including loss of wildlife habitats and biodiversity, pollution, e-waste management, deforestation, lack of access to clean water, degradation of the marine and aquatic environment, insufficient political will, climatic changes, problems with waste (liquid and solid) management, and contemporary biotechnology issues (NEP, 1997, 2021; Williams, 2002).

On the pre-primary, primary, secondary, technical and vocational training (TVET), and higher education levels, there is also an EE/ESD strategy with a clear goal, principles, and objectives that aim to enhance the acquisition of knowledge and skills through teaching and learning or training, awareness, and sensitization to change behavior towards environmental management and sustainability (Hogan, 2008; MoE&VT, 2010).

EE in pre-primary institutions Education aims to mold the character of the child and help them learn appropriate norms of social conduct and behavior, as well as to help them learn, appreciate, respect, and develop pride in their family, cultural backgrounds, moral values, customs, and traditions (MoE&VT, 2010). Education also aims to encourage and promote the overall personality development of the child, which develops physical, mental, moral, and social characteristics and abilities. While in elementary school, EE is integrated as a sub-content, theme, or sub-topic within the science curriculum, social studies curriculum, and ICT curriculum (Kimaryo, 2011; MoE&VT, 2010), and it is incorporated into all of the primary school curriculum's topics, albeit the integration varies widely depending on the subject for example, science, social studies, or geography and is also very focused on the knowledge acquisition component. Consequently, despite all efforts, EE is not taught practically as intended by education and training policy, EE strategy, and the curriculum (Kimaryo, 2011), which focuses more on teaching about the environment and less on teaching in/through the environment.

As a result, there is a gap in the practical implementation of EE in different environmental management activities like gardening, cleaning the school environment, planting trees, waste management, etc. (Kimaro, 2018), which is why students struggle to understand the concepts being (Mwendwa, 2017) and Likewise, just like in primary school, EE in secondary school does not transition into real-world applications (Minja, 2022).

Additionally, although teachers in primary and secondary schools recognize the importance of EE, they lack the competence and motivation to implement it due to a lack of funding, inadequate professional development, a lack of government priority on environmental issues, and a lack of support from the system (Kimaro, 2018; Minja, 2022; Mnyagani, 2022). EE is not a subject in and of itself, and its goals and principles are incompatible with the traditional role and objectives of education (Kimaro, 2018; Mnyagani, 2022). As a result, according to various scholars, there are few obstacles to the proper implementation of EE in Tanzania's primary and secondary schools when it comes to curriculum-

related issues, teaching and learning-related issues, and teacher-related issues generally (Kimaro, 2018; Kimaryo, 2011; Mwendwa, 2017). As a result, EE is somewhat marginalized in the classroom and lacks a perspective for effective implementation (Kimaro, 2018).

Similar to this, EE in TVET-centered teacher trainee curriculum focuses on providing teacher trainees with the opportunity to apply various teaching and learning strategies that enhance participatory learning and observation of real challenges. And help student teachers enhance their knowledge of local, national, and global concerns, particularly those that cut across borders, such as HIV/AIDS, gender, children's rights, and environmental preservation for sustainable development (MoE&VT, 2010; Seif, 2016). The lack of professionalism among EE teachers, the fact that the course is taught as a cross-cutting issue, unfavorable attitudes toward EE teaching, a lack of EE knowledge and expertise, a lack of time, a lack of resources, etc. are some of the obstacles that proper EE in vocational education and training institutions must overcome (Seif, 2016). Universities throughout the nation, including University of Dar es Salaam, Sokoine University of Agriculture, Open University of Tanzania, and others, offer undergraduate and graduate students EE-related courses (like environmental science, environmental engineering, environmental health, EE, and natural resources management, among others). These institutions are comparable to those in India, Ethiopia, and South Africa (MoE&C, 1995; MoE&VT, 2010). However, there is no standardization and harmonization of EE-related courses across all institutions and between departments, much like in Ethiopia's universities. EE-related courses are not connected with other courses.

Environmental Education in South Africa

South Africa has approved and put into effect a variety of national policies and international agreements linked to the environment, just like India, Ethiopia, and Tanzania. As a result, it produced extensive and encompassing environmental legislation. The Bill of Rights, found in Chapter 2 of South Africa's Constitution (No. 108 of 1996), is the most fundamental legal provision in this regard. The Republic of South Africa's constitution guarantees environmental rights for its citizens under Section 24 of the Bill of Rights, which states that everyone has the right to

(a) an environment that is not harmful to their health or well-being and

(b) to have the environment protected for the benefit of both current and future generations (Constitution, 1996).

Similar to how EE developed in Ethiopia and Tanzania, Agenda 21's influence on the 1992 Rio de Janeiro conference (also known as the "Earth Summit") had a direct impact on how EE was perceived and sparked the development of environmental policy in South Africa. A comprehensive and ambitious NEP has been developed based on these core clauses, and it includes strategies, action plans, and implementation procedures (Constitution, 1996; Kranz & Hönke, 2013; Storm, 1996). According to the environmental policy of the nation's objective 18 (Storm, 1996), EE and training program covers formal, non-formal, and trans-disciplinary sectors and integrates EE into national qualification education framework.

Environmental policy in South Africa aims to conduct research into environmental issues like sustainability and environmental accountability and to integrate EE into teaching and learning so that students are prepared to become environmentally responsible citizens and future leaders (Cock & Fig, 2001; Kranz & Hönke, 2013). Although some schools have school-level EE policies that are supported by school governing body (SGB), teachers and principals struggle to understand the policy objective of EE as stated in curriculum assessment policy statements document due to its obscurity (Damoah & Omodan, 2022). Any educational policy's ability to be implemented successfully is largely dependent on the abilities of the instructors and the creation of a curriculum in the schools that has particular objectives and content that adheres to those objectives (Damoah & Adu, 2020).

Theoretically, EE was tried to be integrated into some school curricula, but practically, due to insufficient teacher training and promotion (Damoah & Adu, 2020; Velempini et al., 2018) and an impractical educational curriculum that is not clear on how teachers integrate and deliver EE into their subjects, it has failed (Damoah & Adu, 2020). Due to a lack of educational resources and inadequately qualified instructors, the integration of EE into the curriculum of elementary and secondary schools is not unified and supported by policy (Velempini et al., 2018). And Mashaba et al. (2022), concluded that, despite the limitations of EE in primary school, comparatively, EE offers adequate knowledge in both natural and social science subjects, and they are helping to maintain a clean environment and conservation in their communities; they are doing this by actively participating in the surroundings of the schools, such as school greening, tree nurseries, and tree plantations.

In Bophuthatswana, where both undergraduate and postgraduate courses are offered at University of Bophuthatswana, as well as in all five colleges of education, where a three-year course in EE is offered, EE at the higher institution level, for teachers and decision-makers, was pioneered at the early 1980s. In South Africa, there are some other universities and colleges of education that offer a variety of EE courses, but Rhodes University has the most comprehensive program (Irwin, 1990). According to Velempini et al. (2018), it has been difficult to integrate EE into the curriculum due to a lack of resources and insufficient teacher preparation. Since it strives to offer Southern African and other writers a place for discussion and professional growth, the Southern African Journal of EE also contributed to the awareness raising and transmission of environmental information. To help new authors in the field become established as freelance writers, the journal includes an author support program (Schudel, 2014).

Environmental Education in India

As part of efforts to safeguard the environment, several constitutional modifications have been adopted, and environmental laws and policies have been periodically passed (Sarkar, 2014). In India, EE has a long history, and following the Stockholm Convention in 1972, it produced an environmental strategy. The Ministry of Environment built a

center for EE, and it also established an environmental strategy (Sarabhai & Chhokar, 2009). Due to this, teaching and learning about EE are now required at all levels of formal education in India, making it one of the very few nations worldwide (Sharma & Kanaujia, 2020). National policy of instruction from 1986 served as the foundation for the current EE in schools, which was changed in 1992 to address the goal of EE by incorporating it into the educational process at all levels of school instruction (National Council of Educational Research and Training [NCERT], 2005; Sarkar, 2014; Vasistha, 2010).

Similar to other nations, EE in India attempts to educate pupils about the importance of preserving and caring for the natural world, preventing pollution, and using energy wisely (Yadav et al., 2022). As a result, Indian people's general environmental awareness, knowledge, and activities are increased by EE curriculum (Bhatia, 2020; Shin & Akula, 2021), with little emphasis on environmental problem-solving abilities. In addition, the nation made a number of constitutional revisions to safeguard the environment, and from time to time, environmental laws and policies were passed (Bhat et al., 2017; Sarkar, 2014).

Two national policy papers, namely the Supreme Court's order and national curriculum framework from 2005, have an impact on EE in the formal school curriculum (Praveen & Nasreen, 2016). Making EE required at all educational levels is one of the environmental preservation measures India has launched (Bhat et al., 2017; Bhatia, 2020; Kumari, 2021; Sarkar, 2014). With considerable care, India's national education policy 2020 addresses typical problems with the learning environment and suggests solutions to keep it in top condition. The fact that the new educational system assumes control of a child at the age of three places a great deal of responsibility on it (Kumari, 2021; Puri et al., 2021).

Furthermore, according to Praveen and Nasreen (2016), NCERT has started several levels of interaction with different educational functionaries, including administrators, curriculum planners, teacher educators, and teachers. A national core team and regional teams are working with state boards to promote EE in their states while running orientation sessions and creating training materials. Similar to this, in Indian schools, EE curriculum is taught or implemented through three pedagogical approaches: the addition of independent subjects, extracurricular activities (Bhatia, 2020; NCERT, 2005; Sharma & Kanaujia, 2020; Sharma & Menon,

1996). Additionally, environmental studies (EVS) has been introduced as a stand-alone subject in primary school (grade 3-grade 5) to foster an interest in the environment, in accordance with NCERT's recommendation for the three implementation approaches in the context of EE at the first stage of primary school (grade 1-grade 2).

The strategy is to use the environment as a teaching tool or laboratory for various ideas or events occurring in the local area. While environmental topics are integrated or infused in science, social science, and languages as poems and essays in upper primary (grade 6-grade 8) and secondary (grade 9-grade 10) education. Which follows the infusion approach for EE, and the teaching of science is linked to the daily life experiences of the children. And in senior secondary school (grade 11-grades 12), environmental concepts are given as an infusion approach in elective subjects like biology, geography, chemistry, economics, sociology, and language (Bhatia, 2020; NCERT, 2005; Sharma, 2017; Sharma & Kanaujia, 2020; Sharma & Menon, 1996).

As a result, there have been developments in the concept of ESD in India, including concepts like the whole-school approach that can build on the information supplied by the Supreme Court ruling (Bhat et al., 2017; NCERT, 2005; Sharma, 2017; Sharma & Menon, 1996). Additionally, EE was incorporated into teacher education curriculum, particularly in physical education, and national service training program courses, as well as in science, technology, and society, a general education course. Nevertheless, during implementation, teachers faced difficulties due to a lack of environmental knowledge and time to guide students in taking environmental action (Corpuz et al., 2022). In comparison to practical practices, schools in India's EE used more theoretical educational approaches (Bhatia, 2020). Nevertheless, several researchers argue that schools should adopt EE pedagogical approaches that emphasize practical, experiential, and activity-based learning because they are effective in fostering students' pro-environmental attitudes, sensitivity, behaviors, knowledge, skills, and active participation (Barraza & Walford, 2002; Bhatia, 2020; NCERT, 2005; Pal & Maurya, 2023).

Generally, as shown in the following, the authors, compare and summarized the integration of EE at policy, strategies, at all school level of educational curriculum, with its implementation, and effectiveness. **Table 1** shows summary of integration, implementation, and effectiveness of EE.

Table 1. Summary of integration, implementation, & effectiveness of EE

Activities	Africa			India
	Ethiopia	South Africa	Tanzania	
EE at policy level	Although country's environmental policy & educational policy both embrace EE, there are no distinct & coordinated EE curricular guidelines that show how to put EE into practice.	Although environmental policy & laws have been around for a while, there is still very little EE material included in NEP, i.e., there is no practical and organized policy design for EE in schools.	EE was incorporated into education & training policy, as well as in various sectorial policies. But newly revised NEP (2021) places less emphasis on formal EE contents & approaches as compared to older one.	NEP neatly contained EE & included it in Articles 48A & 51A of National Constitution, & environmental legislation was occasionally passed to safeguard the environment after environmental policies.
EE strategy	There is no defined, specific, & precise EE strategy.	At all educational levels, there is an absence of a clear & precise EE approach & a reduced desire for EE.	Have a defined purpose, guiding concept, & objective for EE strategy.	Have a defined purpose, guiding concept, & specific objective for EE strategy.

Table 1 (Continued). Summary of integration, implementation, & effectiveness of EE

Activities		Africa			India
		Ethiopia	South Africa	Tanzania	
EE at curriculum level	Primary school	Lower classes (grades 1-4) of elementary school curricula include environmental science as a separate subject. In contrast, in second cycle of primary school (grades 5-8), environmental issues are taught as a cross-curricular approach & are only marginally integrated into a few disciplines, either as a topic or a title.	Curriculum's goals and objectives for EE are too general and ambiguous; there isn't a defined specialized EE curriculum with precise instructions and objectives, although some schools add environmental elements to particular disciplines dependent on the wishes of the school governing body.	Through creativity, critical thinking, problem-solving, and lifelong learning, EE is effectively incorporated into all disciplines taught in pre-primary, primary, and secondary schools. It aims to foster indigenous knowledge with a strong environmental emphasis. There are, however, some gaps in the actual application and uneven integration across all topics.	EE topics are covered in lower grades (grades 1-2) through hands-on activities. In primary grades (grades 3-5), EE is taught as a separate subject called EVS. In upper primary grades (grades 6-8) & secondary grades (grades 9-10), environmental ideas are infused into sciences, social sciences, & humanities through poems & essays. Similar to this, environmental topics are also incorporated into elective courses in senior secondary school (grades 9 & 12).
	Secondary school	Similar to secondary phase of primary school (grades 5-8), integration of EE differs in subject breadth, strategy, & the secondary school cycle.			
	Higher education & TVET	According to higher education's educational policies, environmental-related subjects are taught in a variety of professional fields, including environmental science, environmental health, natural resource management, carbon sequestration, green environment, gender, & environment, energy & climate change, environmental engineering, etc., for undergraduate & graduate students at various universities across nation. But there are significant differences between universities & departments within each university.	For several professions at TVET & higher education levels, for undergraduate & postgraduate degrees, an environmental-related issue is provided, either as an independent subject or topic (sub-topic). EE mentions Rhodes University, Bophuthatswana, etc.; but like Ethiopia, there is no single curriculum, no uniformity across various departments & universities, & there are not enough qualified environmental educators. Also, University of Pretoria in South Africa has its own environmental policy, unlike universities in other African nations.	The Competence-Based Education and Training (CBET) strategy, which is in accordance with EE and the Millennium Development Goals (MDGs), is the main focus of the TVET teaching and training system. Practically speaking, EE faced few obstacles from curriculum-related, teaching and learning-related, and resource-, time-, and professional-related factors; as a result, EE is somewhat marginalized in teaching and lacks a clear path for effective implementation.	Similar to other African nations, particularly Ethiopia, environmental-related issues are covered in undergraduate and graduate courses for TVET and higher education as either a stand-alone subject or topic (sub-topic) for a variety of professions.

Table 2 shows summary of qualitative evaluation of effectiveness of EE in the selected country using EE evaluation model (effectiveness, goal-based, and process-based).

It is summarized the qualitative evaluation methods the implementation and effectiveness of EE to meets the goal of EE using EE evaluation model (effectiveness, goal-based, and process-based) and its practical concern.

CONCLUSIONS & RECOMMENDATIONS

Today, saving the entire human race from the various environmental crises it faces and ensuring a sustainable and content future are our top priorities. If this education is ignored, there will not be any environmental awareness, skill, knowledge, sensitivity, or concern. There will also be an imbalance of natural resources, which will lead to an ongoing rise in environmental problems, and there will not be many people left to inhabit the earth. EE tries to incorporate its objectives and motivate students to develop attitudes toward the wise use and conservation of resources, protect their environment, develop a national and international outlook on the environment, enhance all-around development, and make sustainable development in countries like Tanzania and India. Because of this, educational institutions are incorporating EE into their curricula, although various study findings indicate that learners' knowledge and skill development still need to be strengthened.

African nations have made progress in incorporating significant environmental concerns and issues into national policy, educational systems, and curricula for higher education. This success has been achieved particularly in curriculum policies, teacher education programs, and teacher preparation programs. In accordance with this study, all the nations (India, Tanzania, Ethiopia, and South Africa) varied even in the breadth and content of their environmental right, and the matter was formally recognized in their constitutions.

Also, each nation's environmental policy was developed using EE materials and raising awareness of the issue. In India's lower primary grades (3-5) and Ethiopia's lower primary grades (1-4), EE is taught as a separate subject called environmental science (also known as environmental study in India).

Table 2. Summary of qualitative evaluation of effectiveness of EE in selected country using EE evaluation model (effectiveness, goal-based, & process-based)

Activities		Countries				Remarks
		Ethiopia	SA	Tanzania	India	
EE at NEP		Very good	Poor	Very good	Very good	Very good: EE issue was effectively handled policies relating to environment Poor: Certain EE contents that include environmental polic.
School environmental policy		No	Nox	No	Few	No: No environmental policy of school Nox: Other than Pretoria University, no schools have environmental policies Few: Yes, there are a few schools that have an environmental policy
EE strategy		No	No	Yes	Yes	No: Have no EE strategy Yes: Have a clear goal, principle, & objective of EE strategy
EE inclusive curriculum	PS	Poor	Very poor	Very good	Very good	Very poor: There is no organized, unified curriculum that is EE inclusive Poor: Harmonized structure; some environmental content is included in curriculum, but with unclear implementation & guiding principles
	SS	Poor	Poor	Very good	Very good	Good: Structured EE-related teaching materials, but not across departments & all universities in nation (no common courses) Very good: A well-organized, synchronized, inclusive EE curriculum with unambiguous implementation & guiding principles
	TVET & U	Good	Good	Good	Good	
EE *about, in/through, & for* environment	PS	Good	Poor	Very good	Excellent	Excellent (*about, in,* & *for*) environment: Environment used as a medium of instruction & use local environment as a source of a learning experience, facts, & concepts attached to learning EE (education inputs), knowledge aspect of EE teaching of fundamental scientific facts, concepts, & used methodological alternative how teaching & learning process,
	SS	Poor	Poor	Very good	Excellent	Very good (*about* & *in*) environment: Environment is utilized as a medium of instruction with knowledge component of EE teaching basic scientific facts, concepts, & using methodological alternatives in teaching & learning process.
	TVET & U	Very good	Very good	Very good	Very good	Good (*about*) environment: It refers to basic scientific information, concepts, & issues pertaining to biophysical environment are taught as part of knowledge component of EE
Environmental contents in curriculum	PS	Good	Very poor	Very good	Excellent	Excellent: Potentially rich environmental content is provided; it is presented as a separate subject & is practice-based Very good: Substantial environmental material that could be included in all disciplines & promoted indigenous knowledge Good: Potentially rich environmental contents Poor: Few environmental contents are integrated into some selected subjects Very poor: Only at some schools are a few environmental topics incorporated into certain disciplines without being harmonized
	SS	Poor	Very poor	Very good	Very good	
	TVET & U	Good	Good	Good	Good	
Capacity building for professions, financial, & time allocation		Very poor	Very poor	Good	Very good	Very good: In comparison, government places a strong priority on capacity development, appropriate time management, & money allocation. Good: Government emphasizes, proper time, & budget allocation Very poor: Government places very little emphasis on enhancing capacity, allocating enough resources, & budgeting

Note. SA: South Africa; PS: Primary school; SS: Secondary school; & U: University

In India's lower primary grades (1-2), EE is taught through fieldwork and practical activities that connect science to the students' everyday experiences. The education approach is similarly student-centered, issue- and goal-based, practical field observation-based, and adequately addresses EE subjects in this way.

Whereas in Tanzania (pre-primary, primary, and secondary school) and India (upper primary school [grade 6-grade 8] and secondary school [grade 9-grade 12]), EE is taught as an infusion approach or integrated into all disciplines. Tanzania also works to promote indigenous knowledge through fostering creativity, critical thinking, problem-solving, and lifelong learning, with a heavy emphasis on the environment. These EE methods work well and make it simple to accomplish the intended outcome. Even though EE content is well integrated into all courses compared to other African nations, there are some differences in integration among all subjects and a few gaps in actual execution because of issues with finances and resource allocation. Similar to this, in Ethiopia, EE was tried as an integrated approach in the second cycle of primary school (5-8) and secondary school (9-12), where some environmental issues were brought into a few subjects of the natural and social sciences either as topics or chapters.

However, it is difficult to find a clear and defined aim for EE in the curriculum, especially in secondary school, and the integration has no definition, unlike in India and Tanzania, where EE-related idea is very low and not equally integrated throughout all courses and grade cycles (**Table 1**). In geography and biology, there is comparatively limited environmental knowledge, which is similar to South Africa in that there is no fair footing between the several subject integrations. Although a few schools have tried to implement EE policies at the school level with support from SGB, in South Africa, even this has not been successful because teachers and other principals do not understand the importance of EE. In contrast, South Africa's environmental policy prioritizes students becoming environmentally responsible citizens and future leaders and integrating EE into the school's teaching and learning process. A lack of resources for professional development, a lack of government attention on environmental issues, and little to no support for teachers to apply EE when necessary also contribute to the low competence and motivation of schoolteachers in Tanzania and Ethiopia, two other African nations.

For undergraduate and postgraduate degree levels at various higher institutions in India, Tanzania, Ethiopia, and South Africa, EE is offered either as independent courses or integrated with other courses or subjects for environmental engineering, environmental health, environmental science, natural resources management, etc. However, in higher institutions, there is no uniformly EE-related harmonized curriculum in all universities and among departments.

In general, EE in India is more developed, practical-based, integrated with all subjects at all grade levels with a clear EE strategy, promotes positive environmental action, and has a better understanding of the environmental issue than EE in other African countries. In Tanzania, EE tried to integrate with all subjects at all grade levels with a clear EE strategy. Additionally, indigenous wisdom was attempted to be incorporated into the curriculum, but little was done to protect the environment. Similar efforts were made to integrate EE into the curriculum in Ethiopia, but unlike Tanzania, this was only done in a few key courses and not throughout all grade levels. There are very few locally contextualized environmental lessons and skills taught in the classroom that apply to the immediate local environment, even for those EE courses that focus primarily on educating students about general environmental knowledge of global and national issues. Similar to Tanzania and Ethiopia, South Africa attempted to theoretically integrate EE into the school curriculum, but due to an unworkable curriculum that gave instructors no clear guidance on how to include and present EE in their disciplines, it was unsuccessful (**Table 2**).

These demonstrated that, despite efforts made by all nations to incorporate EE into the curriculum, there are significant differences in the practical application due to a variety of factors that obstruct proper application, such as governmental commitment and giving priority, financial constraints, a lack of training and professional competencies, etc. Despite UNESCO's (2020) call for EE to become a staple of every nation's curricula by 2025, there is a significant gap between EE's actual implementation and the achievement of this goal. Therefore, the author advised the followings:

1. Every relevant entity, whether governmental or non-governmental, should give proper implementation and effectiveness of EE significant attention and importance.

2. Each country's EE should be harmonized, practically based, inclusive of indigenous knowledge, inclusive of the local environment, and inclusive of both national and international environmental principles.

3. UNESCO should conduct an advanced evaluation of EE's effectiveness in Africa, identify the major implementation challenges impeding EE's achievement, and then adjust its overall approach.

4. The effectiveness and evaluation of EE in each nation should be the subject of further research.

REFERENCES

Abraham, D. (2013). *Environmental education about, in and for the environment: The case of two secondary schools in Ethiopia* [Unpublished master's thesis]. University of Oslo.

Adamu, A. Y. (2020). The credit system and harmonization of higher education in Ethiopia. *International Journal of African Higher Education, 7*(2), 59-79. https://doi.org/10.6017/ijahe.v7i2.12895

Afrik, T. (1984). The regional programme for the eradication of illiteracy in Africa. *UNESCO.* https://unesdoc.unesco.org/ark:/48223/pf0000200981

Ardoin, N. M., & Bowers, A. W. (2020). Early childhood environmental education: A systematic review of the research literature. *Educational Research Review, 31*, 100353. https://doi.org/10.1016/j.edurev.2020.100353

Barraza, L. (2001). Perception of social and environmental problems by English and Mexican school children. *Canadian Journal of Environmental Education, 6*, 139-157.

Barraza, L., & Walford, R. A. (2002). Environmental education: A comparison between English and Mexican school children. *Environmental Education Research, 8*(2), 171-186. https://doi.org/10.1080/13504620220128239

Bhat, S. A., Zahid, A. T., Sheikh, B. A., & Parrey, S. H. (2017). Environmental education in India: An approach to sustainable development. *FIIB Business Review, 6*(1), 14-21. https://doi.org/10.1177/2455265820170102

Bhatia, N. (2020). Environmental education in India: Analysis of national curriculum and pedagogical approaches. *York University.* https://yorkspace.library.yorku.ca/server/api/core/bitstreams/646eff2f-b332-48f1-b8bd-ff4901d55221/content

Cock, J., & Fig, D. (2001). The impact of globalisation on environmental politics in South Africa, 1990-2002. *African Sociological Review/Revue Africaine de Sociologie, 5*(2), 15-35. https://doi.org/10.4314/asr.v5i2.23189

Constitution, S. A. (1996). *Bill of rights.* https://www.gov.za/documents/constitution/chapter-2-bill-rights

Corpuz, A. M., San Andres, T. C., & Lagasca, J. M. (2022). Integration of environmental education (EE) in teacher education programs: Toward sustainable curriculum greening. *Problems of Education in the 21st Century, 80*(1), 119. https://doi.org/10.33225/pec/22.80.119

Damoah, B., & Adu, E. (2020). Teacher's awareness of the integrated environmental education curriculum in South Africa. *e-BANGI, 17*(6), 280-295.

Damoah, B., & Omodan, B. I. (2022). Determinants of effective environmental education policy in South African schools. *International Journal of Educational Research Open, 3,* 100206. https://doi.org/10.1016/j.ijedro.2022.100206

Delors, J. (1996). The four pillars of education. In *Education: The treasure to be discovered* (pp. 89-102). Cortezo.

Duvall, J., & Zint, M. (2007). A review of research on the effectiveness of environmental education in promoting intergenerational learning. *The Journal of Environmental Education, 38*(4), 14-24. https://doi.org/10.3200/JOEE.38.4.14-24

Elfert, M. (2019). Lifelong learning in sustainable development goal 4: What does it mean for UNESCO's rights-based approach to adult learning and education? *International Review of Education, 65*(4), 537-556. https://doi.org/10.1007/s11159-019-09788-z

EPA. (1997). Environmental policy of Ethiopia. *EPA.* https://www.epa.gov.et/images/Polices/ENVIRONMENT_POLICY_OF_ETHIOPIA.pdf

EPA. (2002). Environmental education guidelines to Ethiopia. *EPA.* https://www.epa.gov.et

FDRE. (1994). *Training and education policy of Ethiopia.* https://www.cmpethiopia.org/content/download/3558/14550/file/Education%20and%20training%20policy,%20Ethiopia,%201994.pdf

FDRE. (1995). *Constitution of Federal Democratic Republic of Ethiopia (Proclamation No. 1/1995).* https://www.ethiopianembassy.be/wp-content/uploads/Constitution-of-the-FDRE.pdf

Fisseha, G. (2008). *The status of environmental program in Addis Ababa and Jimma universities* [Unpublished master's thesis. Addis Ababa University.

Gunjan Verma, P. D. (2017). Environmental education as a subject in schools. *International Journal of Advanced Research, 5*(8), 1547-1552. https://doi.org/10.21474/IJAR01/5214

Hogan, A. R. (2008). *Education in the wetlands and wetlands in the education: A case of contextualizing primary/basic education in Tanzania* [Master's thesis, Rhodes University].

Husen, A. (2018). *Integration of environmental education into Ethiopian primary school curricula with particular emphasis on Jimma Zone of Oromia Region* [PhD thesis, Addis Ababa University].

Irwin, P. (1990). The concept of environmental education and the development of environmental education in South Africa. *Southern African Journal of Environmental Education, 11,* 3-7.

Kassaye, W. (2013). Curriculum development and research in Ethiopia. In W. F. Pinar (Ed.), *International handbook of curriculum research* (pp. 161-182). Routledge.

Keong, C. Y. (2020). *Global environmental sustainability: Case studies and analysis of the United Nations' journey toward sustainable development.* Elsevier.

Khademi-Vidra, A. (2017). Curriculum planning of the environmental education. *Journal of Central European Green Innovation, 5,* 65-80.

Kimaro, A. R. (2018). *Integrating environmental education (EE) for sustainability into primary school curriculum in Tanzania: Exploring stakeholders' views and perceptions* [PhD thesis, Schwäbisch Gmünd University of Education].

Kimaryo, L. (2011). *Integrating environmental education in primary school education in Tanzania: Teachers' perceptions and teaching practices.* ÅBO Akademi University Press.

Kranz, N., & Hönke, J. (2013). Environmental policy in South Africa. In T. A. Börzel, & C. R. Thauer (Eds.), *Business and governance in South Africa: Racing to the top?* (pp. 123-127). Springer. https://doi.org/10.1057/9781137317810_8

Kumari, S. (2021). Environmental education in context of new education policy 2020. *International Research Journal of Engineering and Technology, 8*(3), 1929-1936.

Laiphrakpam, M., Aroonsrimorakot, S., & Shanker, A. R. (2019). Environmental education and awareness among students in India, Japan and Thailand for sustainable development. *Interdisciplinary Research Review, 14*(2), 48-53.

Lotz-Sisitka, H. (2011). Teacher professional development with an education for sustainable development focus in South Africa: Development of a network, curriculum framework and resources for teacher education. *Southern African Journal of Environmental Education, 28,* 30-71.

Lotz-Sisitka, H., Belliethathan, S., Pradhan, M., Odeke, G., & Waswala, B. O. (2016). Africa environmental education and training action plan 2015-2024: Strengthening sustainable development in Africa. *United Nations Environment Program.* https://www.unep.org/resources/report/africa-environmental-education-and-training-action-plan-2015-2024-strengthening

Loubser, C. (2005). *Environmental education: Some South African perspectives.* Van Schaik Publishers.

Makundi, E. (2003). Environmental education curriculum policy in Tanzanian schools. *Southern African Journal of Environmental Education, 20*, 135-141.

Mashaba, E. K., Maile, S., & Manaka, M. J. (2022). Learners' knowledge of environmental education in selected primary schools of the Tshwane North District, Gauteng Province. *International Journal of Environmental Research and Public Health, 19*(23), 15552. https://doi.org/10.3390/ijerph192315552

Minja, O. B. (2022). Assessment of the integration of environmental education in social science subjects towards environmental conservation in Arusha City public secondary schools, Tanzania. *Journal of Research Innovation and Implications in Education, 6*(2), 370-381.

Mnyagani, F. C. (2022). Enviromental education in Tanzanian secondary schools. An exploratory case study from teachers' perspectives. *GUPEA*. https://gupea.ub.gu.se/handle/2077/74289

MoE&C. (1995). *Education and training policy of Tanzania*. Adult Education Press.

MoE&VT. (2010). *Environmental education strategy 2010-2014*. Ministry of Education and Vocational Training.

MoE. (2009a). *Curriculum framework for Ethiopian education (KG-grade 12)*. Federal Democratic Republic of Ethiopia.

MoE. (2013). *Nationally harmonized curriculum of higher education institution*. Ministry of Education.

MoE. (2015). *Education sector development program IV (ESDP V), (2015-20190) program, action plan /PAP*. Ethiopia Federal Democratic Republic of Ethiopia.

MoE. (2019). *Report on states of higher education*. Ministry of Education.

Mwendwa, B. (2017). Learning for sustainable development: Integrating environmental education in the curriculum of ordinary secondary schools in Tanzania. *Journal of Sustainability Education, 12*(24). https://doi.org/10.25073/0866-773X/65

Nath, B. (2009). Formal environmental education at preschool, primary, and secondary levels. *Environmental Education and Awareness, 1*, 72.

NCERT. (2005). *Environmental education as infused in NCERT syllabus for classes I to XII as per NCF 2005*. National Council of Educational Research and Training.

NEP. (1997). *National environmental policy of United Republic of Tanzania*. Ministry of Water and Livestock Development.

NEP. (2021). *National environmental policy of United Republic of Tanzania*. The United Republic of Tanzania.

Obol, C., Allen, I., & Bach, H. S. (2003). Environmental education policy processes in the Southern African Region. *Southern African Journal of Environmental Education, 20*, 22-38.

OECD. (2018). *The future of education and skills: Education 2030*. OECD Publishing.

OECD. (2019). *An OECD learning framework 2030*. Springer. https://doi.org/10.1007/978-3-030-26068-2_3

Omari, I. M., & Baser, H. (2014). Teacher education (non university). *United Republic of Tanzania Ministry of Education and Vocational Training*. https://www.moe.go.tz/en

Pal, P., & Maurya, N. K. (2023). *Environmental education in India*. https://www.ecoedhub.com/environmental-education-in-india.html

Praveen, H., & Nasreen, N. (2016). *Status of environmental education at secondary school level in India* [paper presentation]. The International Conference on Education.

Puri, K., Vel, A. S., Manoharan, N., James, R. A., & Joshi, R. (2021). Environment education in India: Challenges and opportunities. *The Holistic Approach to Environment, 11*(4), 122-127. https://doi.org/10.33765/thate.11.4.3

Sarabhai, K. V., & Chhokar, K. B. (2009). Environmental education in India: Evolution of education as a tool for sustainable development. In K. V. Sarabhai, & K. B. Chhokar (Eds.), *Environmental education in context* (pp. 51-61). Brill. https://doi.org/10.1163/9789087909635_007

Sarkar, D. N. (2014). Environmental policy in India. *Ars, 3*(2), 17-20. https://doi.org/10.51983/arss-2014.3.2.2745

Schudel, I. (2014). Exploring a knowledge-focused trajectory for researching environmental learning in the South African curriculum. *Southern African Journal of Environmental Education, 30*, 96-117.

Seif, H. A. (2016). *Implementation of environmental education in vocational education and training institutes: A comparative study between Tanzania and Finland* [Master's thesis, Mzumbe University].

Semegne, H. (2007). *The status of environmental education in the metropolis schools of Addis Ababa* [Master's thesis, Addis Ababa University].

Sharma, P. K. (2017). Rationale for the approach to environmental education in schools-India. *Education India Journal: A Quarterly Refereed Journal of Dialogues on Education, 6*(3).

Sharma, P. K., & Kanaujia, P. R. (2020). Journey of green schools in India. In A. Gough, J. C.-K. Lee, & E. P. K. Tsang (Eds.), *Green schools globally: Stories of impact on education for sustainable development* (pp. 203-226). Springer. https://doi.org/10.1007/978-3-030-46820-0_12

Sharma, P. K., & Menon, S. (1996). *Compulsory environmental education in India. A case study*. https://cdn.naaee.org/sites/default/files/casestudy

Shin, H., & Akula, S. (2021). Educators' perspectives on environmental education in India. In H. Shin, & S. Akula (Eds.), *Curriculum and learning for climate action* (pp. 276-290). Brill. https://doi.org/10.1163/9789004471818_018

Silva, E., & Sá, A. A. (2018). Educational challenges in the Portuguese UNESCO global geoparks: Contributing for the implementation of the SDG 4. *International Journal of Geoheritage and Parks, 6*(1), 95-106. https://doi.org/10.17149/ijg.j.issn.2210.3382.2018.01.007

Stern, M. J., Powell, R. B., & Hill, D. (2014). Environmental education program evaluation in the new millennium: What do we measure and what have we learned? *Environmental Education Research, 20*(5), 581-611. https://doi.org/10.1080/13504622.2013.838749

Storm, J. A. (1996). South Africa's new environmental policies: Making green the new dominant color. *Georgetown International Environmental Law Review, 9*, 641.

Suhifatullah, M. (2022). Learning to find the meaning of life as educational pillar innovation beyond the unesco concept. *Educenter: Jurnal Ilmiah Pendidikan* [*Educational Scientific Journal*]*, 1*(12).

Teferra, D. (2013). Funding higher education in Africa: State, trends and perspectives. *Journal of Higher Education in Africa/Revue de l'enseignement supérieur en Afrique, 11*(1-2), 19-51. https://doi.org/10.57054/jhea.v11i1-2.1544

Thomson, G., Hoffman, J., & Staniforth, S. (2003). *Measuring the success of environmental education programs*. Canadian Parks and Wilderness Society and Sierra Club of Canada.

UNEP. (1992). *Agenda 21: Earth Summit: the United Nations programme of action from Rio*. CreateSpace Independent Publishing Platform.

UNESCO. (2004). *Educating for a sustainable future: Commitments and partnerships*. UNESCO.

UNESCO. (2019). Framework for the implementation of education for sustainable development (ESD) beyond 2019. In *Proceedings of the UNESCO General Conference*. UNESCO.

UNESCO. (2020). Education for sustainable development: A roadmap. *UNESCO*. https://doi.org/10.54675/YFRE1448

Vasistha, K. (2010). *Kalika Yatna-premise and practice−A programme evaluation report*. http://ir.riemysore.ac.in:8080/jspui/handle/123456789/1001

Velempini, K., Martin, B., Smucker, T., Ward Randolph, A., & Henning, J. E. (2018). Environmental education in southern Africa: A case study of a secondary school in the Okavango Delta of Botswana. *Environmental Education Research, 24*(7), 1000-1016. https://doi.org/10.1080/13504622.2017.1377158

Waktola, D. K. (2009). Challenges and opportunities in mainstreaming environmental education into the curricula of teachers' colleges in Ethiopia. *Environmental Education Research, 15*(5), 589-605. https://doi.org/10.1080/13504620903151024

Williams, C. (2002). Lessons from school-based environmental education programs in three african countries: Office of Sustainable Development, Bureau for Africa GreenCOM, environmental education and communication project, USAID, Washington, June 2000, no ISBN, 52 pp including annexes. *International Journal of Educational Development, 22*(1), 99-100. https://doi.org/10.1016/S0738-0593(01)00005-0

Wolde, D. (2008). The role of education in addressing environmental problems and sustainable development of Ethiopia. *IER Flambeau, 15*(1), 1-38.

Yadav, S. K., Banerjee, A., Jhariya, M. K., Meena, R. S., Raj, A., Khan, N., Kumar, S., & Sheoran, S. (2022). Environmental education for sustainable development. In *Natural resources conservation and advances for sustainability* (pp. 415-431). Elsevier. https://doi.org/10.1016/B978-0-12-822976-7.00010-7

Yanniris, C. (2021). Education for sustainability, peace, and global citizenship: An integrative approach. *Education Sciences, 11*(8), 430. https://doi.org/10.3390/educsci11080430

Yeshalem, A. D. (2013). *Environmental education **about, in** and **for** the environment: The case of two secondary schools in Ethiopia* [Master's thesis, University of Oslo].

Yeshodhara, D., & Naia, S. M. B. (1998). *Environmental awareness among the students of African countries in Mysore City*. https://core.ac.uk/download/35357062.pdf