

ENVIRONMENTAL AND SUSTAINABILITY EDUCATION IN GHANA: ACHIEVEMENTS AND CHALLENGES

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Abstract

There is an enhancing emphasis on environmental and sustainability education worldwide. Fostering improvement actions in rural countries is essential since they are highly dependent on the weather and other environmental issues (deforestation, land degradation, and water pollution). The study aims to review the state of education in managing ecological problems at various educational levels based on a qualitative secondary data analysis. The findings reveal that regardless of efforts to integrate sustainability into curricula, including new subjects and revised syllabi, gaps remain in training for trainers, curriculum coherence, and community engagement. There is a need for a comprehensive framework, enhanced teacher preparedness, and social mindset shifts to ensure that environmental and sustainability education effectively contributes to Ghana's sustainable development goals.

1 Introduction

Education plays a pivotal role across the other sectors worldwide. Professional training and academic achievements are both required to improve performance. The study deals with Ghana, an agrarian country located in West Africa, where dependence on the environment is high. The share of value added by the agricultural sector to the GDP in 2022 was 20.9%, making the sector critical for economic growth and food security issues [1, 2]. Agricultural activities, both large and subsistence farming, depend on fertile soils, favorable climates, and water access, yet have led to environmental challenges such as deforestation, water pollution, and land degradation, exacerbated by slash-and-burn farming methods [3].

The Environmental Protection Agency of Ghana [4] reported threatened sustainability by the growing population and intensified agricultural activities together since these exhaust the natural resources [5, 6, 7]. In 1972, the United Nations Conference on the Human Environment highlighted the importance of educating youth on environmental problems, particularly the underprivileged ones [8]. In line with this goal, the National Curriculum Council forces engaging children in environmental education to improve understanding and responsible participation in environmental protection [9]. In 2002, the Education Review Committee recognized environmental education's relevance. Despite the efforts made by the education service about the UN's Sustainable Development Goals, their report noted the lack of structured programs in schools [10, 11, 12].

The study focuses on the environmental and sustainability education programs at different levels of Ghanaian schools to draw the challenges, it is specifically aimed at examining the implementation of environmental and sustainability education across the various levels of education in Ghana and identifying challenges faced, gaps that exist in incorporating environmental and

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sustainability education into the curriculum. The study employed a qualitative research design that emphasizes the collecting, reviewing, and analyzing of secondary data on environmental and sustainability education in Ghana's educational system; document analysis was used in this regard.

Documents from various government institutions (Ministry of Education, Ghana Education Service, National Council for Curriculum Assessment, etc.) were reviewed concerning curriculum implementation, teacher training and preparedness, and student outcomes. These help in assessing the effectiveness of environmental and sustainability education programs in Ghana's educational institutions.

Specific databases used were Google Scholar, Science Direct, and PsycINFO. Based on the research aim, relevant keywords were entered into various databases to search for papers discussing environmental and sustainability education in Ghana. The findings from these papers were then analyzed thematically to assess how effective have environmental and sustainability education programs been at the various educational levels and the challenges that have been documented in implementing environmental and sustainability educational programs at the various levels of educational institutions in Ghana. Common points affecting the results and the missing elements offer an initial basis for strategy development in the field.

2 Ghana's Environmental Performance

Figure 1 gives an outlook of environmental performance in Ghana as against other European countries using a database available at Yale University. The Environmental Performance Index (EPI), provides a data-driven summary of the state of sustainability around the world. The indicators provide a procedure for identifying problems, setting targets, tracking trends, and identifying best policy practices. Scores close to 100 signify excellent environmental performance in line with global environmental sustainability goals, on the other hand, scores close to zero mean poor environmental performance which demands improvements to address environmental challenges. It can be concluded that Ghana's score in air quality, biodiversity, water resources, and climate change is low compared to the results of leading European countries. Ghana's EPI score was 36.9 in 2024, while other countries performed much better. France (67.0), Denmark (67.7), Switzerland (67.8), the United Kingdom (72.6), and Finland (73.8). The comparison is a clear indication that Ghana needs to establish more effective sustainability actions.

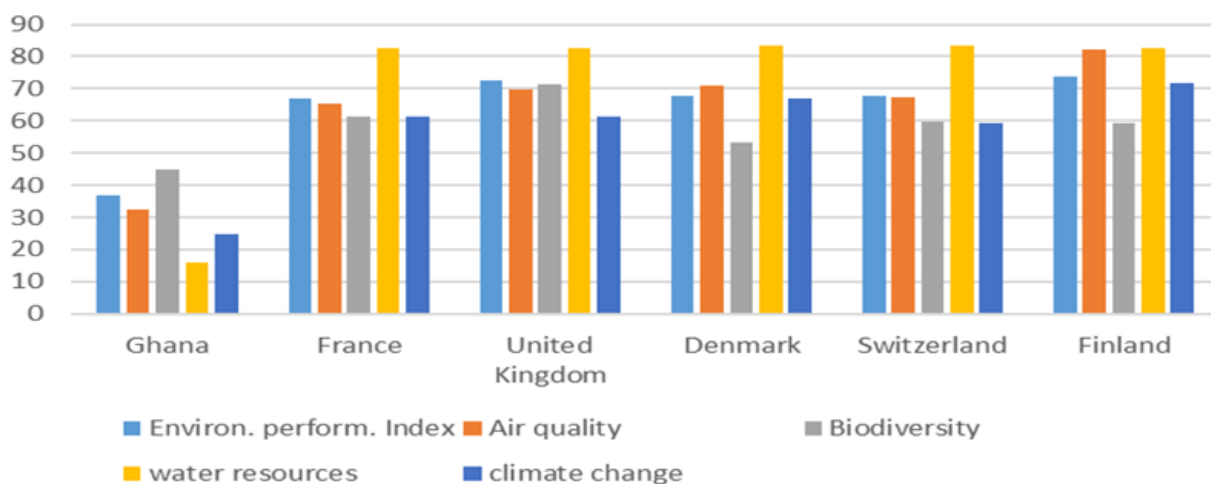


Figure 1. Environmental Performance Index in selected countries (based on the data available at <https://epi.yale.edu>)

3 Environmental education and sustainable development

Environmental education plays a crucial role in shaping individual minds to understand and accept the actions of environmental protection and sustainability. Public awareness, local participation, and social discussions are key to effective responses to the threats [2, 13]. UNESCO

has assured an international framework through the 'Decade of Education for Sustainable Development' (ESD) between 2005 and 2014. The program was followed by the 'Global Action Programme' (GAP), focusing on policy development for integrating sustainability into education. The goals cover enhancing education capacities, empowering young people, and promoting community-level actions [14].

Kagawa [15] argues that there is a worldwide intention to integrate sustainable development into all educational levels. However, the gap between the available support and the effective implementations requires further research. In the sense of the message by Brundtland Commission's definition of sustainability, the field covers environmental security, equity, and social justice [16]. Recent global crises, including natural and humanitarian catastrophes, underscore the urgent need for action, and education must serve them. The UN's Agenda 21 stresses education's critical role in promoting sustainability [17]. However, many educational curricula lack a focus on sustainability, especially in Africa, where countries like Ghana have not adequately addressed these shortcomings or embedded sustainability principles [18].

4 Environment and sustainability in Ghanaian education

The National Council for Curriculum and Assessment (NaCCA) is responsible for developing new curricula, textbooks, and other educational materials, as well as monitoring their use in Ghana. A new approach has been introduced for primary schools in 2019. That is an elementary step in the process of total restructuring the education system in line with the long-term national and international goals. This presupposes that the new curriculum will imbibe in the learners at the early stage knowledge on environmental, climate change, and sustainable development. NaCCA has introduced a new course, 'Our World Our People', which aims to imbibe in the learners' honesty and creativity and, above all, to become responsible citizens [19]. This positive attitude will translate into making independent and healthy decisions in line with their personal development and being more responsive to issues around them and their immediate environment, thereby becoming conscious of their activities.

The new curriculum emphasizes the principle of education for sustainable development, which encompasses social learning, empowerment of communities and citizens, engagement in key social issues such as human rights, poverty reduction, sustainable livelihoods, environmental education, and gender equality, and support changes in behavior to enhance the creation of a more sustainable future. Anderson [20], in his 2010 policy brief, 'Combating Climate Change through Quality Education' succinctly affirms these principles in the new curriculum.

Certain curricula were designed to integrate environmental and sustainable development issues at the senior high school level. Social studies and integrated science are common courses that promote environmental issues. Likewise, elective courses such as agricultural science, geography, and biology have also been established for environmental purposes.

A review of documents shows that college students in Ghana take at least seven foundation courses, including Mathematics, English, Ghanaian language and culture, Integrated Science, Social studies, Vocational skills, and Religious and moral education [21]. The analyses revealed that integrated science includes topics affecting environmental problems and sustainability, such as ecosystems dealing with the adaption of organisms to their habitat and infectious diseases, with a discussion on sanitation. In addition, the issue of soil depletion is of high emphasis. Social studies incorporate general environmental issues and environmental problems.

Universities are often recognized as important economic drivers with considerable impact on their surrounding regions as well as serve as hubs of innovation and intellectual advancement, positioning their campuses as optimal environments for disseminating knowledge about sustainable development; by equipping students with such knowledge, universities enable graduates to effectively advocates for, and promote sustainable practices in various context beyond their academic career. Documents analyses on environmental and sustainability education in African universities, particularly Ghana universities, revealed that their activities center more on what is missing than those that do exist (teaching, research, campus operation, and community outreach). Work by Darkwa [22] found that students ideally understand the concept of 'green' in line with the environment as good vegetation cover, which is achievable through tree planting and likening

sustainability to efficient use of resources by which the current generation can meet their needs without compromising the effort of the future generation to meet their needs. However, the participants for the study were from diverse study programs, which means that though students do have ideas about environment and sustainability education in practical terms, they may be handicapped because their courses do not have environmental sustainability education.

Under the curriculum integration program, the Kwame Nkrumah University of Science and Technology developed full degree programs in the fields of environmental science, sustainable development, and energy studies. The goal was to prepare future experts through a common understanding of the knowledge base, methods, and strategies for assuring sustainability, including topics such as renewable energy, waste management, or climate change. Of course, Ghanaian universities also incorporated sustainability in research programs, especially regarding renewable energy technologies that also serve social purposes by supporting the development of rural communities. The efforts are aligned with the 7th Sustainability Development Goal on Renewable Energy. The universities show pilot projects in their operations: infrastructure development leads to energy efficiency, cost saving, and improved ecological footprints. Energy-efficient infrastructure can be achieved by installing solar panels on some campus buildings and using energy-saving devices to reduce electricity consumption [23]. Kwame Nkrumah University of Science and Technology has established a green campus initiative, leading to more green spaces. Moreover, collaboration and partnership with local governments, international organizations, and NGOs to undertake initiatives beyond their campuses are common. The University of Cape Coast also collaborates with the United Nations University Institute for Natural Resources in Africa to support research that promotes sustainable land and water management in rural communities.

5 Key challenges in the implementation of environmental and sustainability education in Ghana

Despite the global recognition of the relevance of environmental and sustainability education, the implementation of the actions is saddled with numerous challenges due to structural, pedagogical, and socio-economic factors.

A remarkable challenge is the inadequate curriculum integration of environmental education at different levels of education. Some case studies offer best practices, but there is a need for a broader approach. Acknowledging that Ghana's Education Service has made huge efforts to integrate environmental education within the curriculum in subjects like science, social studies, biology, and geography, the topics within these subjects are covered superficially and lack a comprehensive approach to sustainability. The teaching of environmental education is not performed systematically and hence there are fragmentations in getting a deeper understanding by the learners and this normally also leads students not to have interest in environmental sustainability education because they only concentrate on examinable topics. Mutisya et al. [24] confirmed that students have positive attitudes toward the environment and feel there is a need to conserve it, but they are not keen on embracing environmental education in class. Again, it was found that the absence of a dedicated curriculum framework for environmental and sustainability education means that teachers have little guidance on how to incorporate sustainability education into their lessons, and this situation is very worrying owing to the rate of wanton destruction of the environment in the various communities in Ghana by the inhabitants.

The review of related documents suggests insufficient teacher training. The inability of teachers to teach environmental-related topics stems from the fact that most teachers have not received adequate training on sustainability education, and this leaves them with little or no knowledge to teach effectively; this lends support to claims by Ntumi et al. [25] when they stated that, most of the time curriculum revision is done in response to global changing needs and hence result in unpreparedness by many teachers to teach most of the topics in the revised curriculum because of lack of textbooks leading to a lack of depth in students learning. In addition to this, professional development programs that can help bridge this gap are either insufficient or unavailable.

Cultural and social attitudes can be identified as major hindering factors in teaching sustainability in Ghana. Since the indigens' livelihood depends on the environment, many communities allow their thoughts on economic survival to take precedence over ideal sustainable practices. This mindset largely hinders the effectiveness of school-based sustainability programs as students always face stiffer opposition from their community members in their quest to apply what they are taught in schools in their various communities. The missing connection between the formal education system and community practices often results in environmental sustainability education being perceived as an abstract concept rather than a practical necessity.

An analysis of environmental and educational policy documents from the respective ministries revealed varied gaps and inconsistencies. Ghana's Environmental Sanitation Policy (2010) emphasizes the importance of environmental education at all levels of the education system that integrates environmental sustainability into school curricula to promote awareness and responsible environmental practices among students; also there is a pre-tertiary education curriculum framework (2019) which guides basic and secondary education in Ghana to incorporate aspects of environmental sustainability under subjects like social studies and science. However, there are unclear policy guidelines for educators to follow. Schools are often given broad directives without clear frameworks on how to integrate environmental sustainability into daily teaching across subjects [26]. That ideally results in different interpretations of the policy across schools, with some institutions integrating environmental education effectively, leaving others overlooked entirely due to lack of clarity. The inconsistencies are presented in resource disparities. Urban schools that have better funding and access to educational materials tend to implement environmental sustainability education more effectively than their counterparts in the rural areas, which often struggle because of inadequacy of infrastructures, limited teaching materials, etc. This disparity leads to an uneven distribution of students with environmental knowledge. Content analyses from media outlets showed a lack of political will as a challenge in dealing with environmental issues in Ghana. Recently, the topography of various towns in Ghana that are endowed with mineral deposits has been altered largely by illegal miners. The promise failed to risk presidential power in combating illegal mining that has destroyed a significant number of water bodies in Ghana [28].

6 Conclusion

Sustainable development is dependent on the environment, and as a result, environmental and sustainability education has become critical for promoting such an agenda worldwide. In Ghana, efforts by the National Curriculum and Assessment (NaCCA), to integrate environmental topics in most of the subjects in senior high schools, especially in science, social studies, and geography as well as introducing an entirely new subject "Our World Our People" (OWOP) at the basic school steps in the right direction to imbibe in the learner's environmental consciousness at the formative stages. Universities in Ghana have also made strides in fostering environmental consciousness; for instance, Kwame Nkrumah University of Science and Technology (KNUST) has in its study domains degree programs in the fields of environmental science, sustainable development, and energy studies, which ideally touch on environmental and sustainability-related issues.

Regardless of these strenuous efforts in line with environmental and sustainability education, the document analyses revealed inconsistencies in integrating environmental and sustainability education. This indicates that the approach is fragmented and lacks depth. The study found that inadequate curriculum integration, insufficient teacher training, and cultural and social attitudes, are key challenges. The results suggest that the majority of the teachers were ill-prepared to teach environmental and sustainability topics due to limited professional development opportunities. Again, several cultural practices were identified that place much emphasis on the immediate economic survival of the inhabitants, as opposed to long-term environmental and sustainability practices, and this greatly affects good environmental and sustainability practices in Ghana.

Conclusively, in as much as there are conscious efforts to integrate environmental and sustainability education into the Ghanaian school curriculum, a gap remains. Addressing these gaps demands a very cohesive and structured approach, which involves the development of curriculum framework that focuses on environmental and sustainability concepts across all the subjects in the respective levels of education in Ghana and teachers must be equipped with the needed skills that

are viable through regular and well funded professional development programs which aimed at sustainability education in Ghana. Cultural and socio-economic barriers to effective environmental and sustainability education can be addressed through fostering community engagement and collaboration with local stakeholders. Finally, the incorporation of circumstantial environmental learning initiatives like practical projects on climate change adoption, renewable energy, and conservation that reflect social attitudes that help in sustainability.

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