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School curriculum and environmental sustainability

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Abstract. Despite far-reaching environmental concerns, school curriculum in Kenya lacks adequate environmental sustainability address, yet global indicators show deterioration of the environment in developing countries is obviously leading to loss of biodiversity, rise in carbon levels, climate change (UNESCO. 2016) and overall poor-quality life. Research conducted on values education and environmental sustainability determined effective approaches to promote environment sustainability among school going children in Kenya. Inadequate environmental values education was hypothesized to lead to low awareness and action towards sustainability. To determine the extent to which Kenya's education curriculum addresses environmental sustainability values for ESD, the findings form a basis for proposing innovation in EESD in school curricular. Mixed research design involved content analysis of the curricula and textbooks, descriptive surveys and expert interviews. Multistage sampling was applied among students and teachers from 8 former provinces of Kenya for administration of questionnaires to determine environmental content in educational materials, values and skills taught. Expert officials from KICD, MOEST, and UNEP were selected using purposive sampling for interviewing on required content, policy and adequacy. Findings indicated that EESD is not explicitly taught, does not adequately reflect in curricular objectives or textbooks, teaching on environment is mainly knowledge based and lacks experiential learning activities, heads of department (50%) have no training on environmental issues, students (51.8%) have not learnt enough of environmental issues, teachers (56%) are not motivated to teach about environment, and over 62% of teachers report the curriculum is insufficient to develop environmental values. MoE and NEEMA confirmed that values and policy on environmental sustainability are insufficiently taught, teachers are inadequately trained and initiatives on curriculum for environmental sustainability are inconclusive. Teaching and learning for EESD in Kenya is based on inadequate content, values and methodology. In conclusion appropriate EESD content, values and methodologies should be integrated in unfolding curriculum reviews for school.

Keywords. School Curricular, Environmental Education, Environmental Education for Sustainable Development, Environmental Sustainability

Background & Introduction

Despite far-reaching environmental concerns, the school curriculum have not explicitly addressed the issues of environmental sustainability. Planet earth, physical wealth and well-being for a growing population are all at threat. Planet earth has been over exploited for natural resources. This has led to significant loss of biodiversity, rise in carbon levels leading to climate change that is associated with extreme weather (UNESCO. 2016). Additionally,

various forms of toxic substances are present in air, water, soil, plants and animals and the planet is threatened with desertification, drought and land degradation (United Nations, 2015a). UNESCO (2016) links the negative environmental issues with a widening gap between the rich and the poor, increased poverty, unclean air and drinking water, lack of adequate diet, and forceful family displacement due to conflicts.

Environmental sustainability is about responsibly interacting with the planet to maintain natural resources and avoid jeopardizing the ability for future generations to meet their needs (UN, 2020). To address the sustainability matter, international treaties have developed a response referred to as Education for Sustainable Development (ESD). However, insufficient empirical data relating to decisions and implementations concerning sustainable development connecting environmental concerns with social economic development still lingers on. With the United Nations Decade of Education for sustainable Development (2005-2014), the United Nations Educational, Scientific and Cultural Organisation (UNESCO), Global Action Programme (GAP) efforts, many nations are beginning to scale up on Education for Sustainable Development (UNESCO, 2014). The efforts in the decade has seen ESD matured from awareness, capacity building, experimentation and implementation of good practice and there is need to show prove for implementation and success of ESD in primary and secondary schools in Kenya.

Global indicators show there is continued deterioration of the environment in the developing countries such as Kenya. The general thesis of the study was that there is inadequate values education at various levels of the education system leading to lack of awareness of importance of the environment and therefore limited action at community and National level.

Global warming causes species extinction, and conflict(3) over scarce resources. The Commission for Sustainable Development (CSD, 1998) reviews on agenda 21 from Rio de Janeiro, 1992 affirmed the importance of Education for Sustainable Development. Although Kenya is part of United Nations, it is not clear whether any programs have been undertaken in form of curriculum orientation to ensure Education for Sustainable development. The study undertaken in 2018-2020 and ongoing sought to evaluate the efforts made towards environmental sustainability within the Kenya Education system.

The study was inspired by the sentiments of the United Nation's Decade of Education for Sustainable Development (DESD) which indicated that its overall impact on educational thinking and practice remains unclear and unseen in most places and regions of the world, including Africa (Manteaw, 2012, & Africa Regional Consultation to Support Planning for an ESD Programme Framework, 2014). In addition, ESD (2014) recognizes that sustainable development cannot be achieved through political agreements, financial incentives or technological solutions alone, but rather it requires changes in human thinking and action and therefore education's critical role is needed for the required change. As such action at all levels is required to fully mobilize the potential of Education for Sustainable Development and enhance learning opportunities for the attainment of the environmental sustainable goal.

Furthermore, Kenya Vision 2030 attainment is one of a 'nation living in a clean, secure and sustainable environment' driven by the principles of SD. In reaction to the principles of SD, Kenya developed an ESD implementation strategy to provide an enabling environment and capacity for all sectors and stakeholders to effectively contribute towards the achievement of sustainable development. The strategy is aimed at; Enhancing the role of education and learning for equitable, efficient and sustainable utilization of the country's resources, promoting quality education through diverse learning and public awareness for improved quality of life and

productive livelihoods; and promote teaching and learning that inculcates appropriate values, behaviour and lifestyles for good governance and sustainability.

Notably Education for Sustainability is more than knowledge base related to environment, economy and society. It addresses learning skills, perspectives and values that guide and motivate people towards sustainable livelihood. It also involves studying local and global issues. In effect, Education for Sustainable Development must focus on knowledge, skills, perspectives, values and issues in a formal curriculum.

Kenya has made efforts in integrating Environmental Education in line with the ESD. Currently, Environmental Education (EE) is integrated in different levels of education. At early childhood education level, EE is integrated in the curriculum using a thematic approach. At the primary and secondary school level, environmental issues are mainstreamed in the existing subjects, mainly science, social studies and geography using a multidisciplinary approach. All teacher-training colleges currently offer courses in EE. The same case applies to university level education where faculties/departments of Environmental Studies exist. Some universities use an interdisciplinary approach (Kinyua, 2001). However, the key challenge towards effective Environmental values education are the limitations within the curriculum. A study by Kinyua (2001) revealed that although the environmental issues are integrated in existing subjects, there are very few objectives related to EE. As a result, the subject does not draw a lot of attention from both the teachers and students. In a study by Kimaryo, (2011), teachers reported that the approach used to integrate environmental education into the school curriculum was not appropriate since the methodology is not well demonstrated.

In view of Mutisya (2011) and Kimaryo (2011), the existing curriculum also focuses more on theory work, with minimal practice yet research has shown that Environmental Education values should be taught both theoretically in class and practically provide solutions to local environmental issues thus empowering schools, teachers and pupils and communities to collaboratively act in conservation of environments (Mutisya, 2011). The theory and the methodology of environmental education as it is currently is not adequate (Kimaryo, 2011).

There is therefore need to review the existing education curriculum to provide the teachers with clear guidelines on the methodology that can be used in delivering the environmental values education. With the many gaps in delivering environmental values through the education system in Kenya, a big part of the population lacks the values. Therefore, the researchers took the mandate to investigate ESD is mainstreamed in the curriculum with the hope to influence orientation of the curriculum towards sustainability of the Environment.

Daystar University, a liberal arts institution of higher learning conducted a research on the relationship between curriculum and environmental values. The research sought to find out how the curriculum in primary and secondary school affected the environmental values of learners. Perhaps it would be good to outline some of these values here. A total of 3049 students and 199 Heads of Departments (HoDs) drawn from various regions in Kenya including Nairobi, Western, Mombasa, Central, and Eastern/North Eastern regions participated in this study. The participants of the study included 54% female and 45% male students. A 46% of the HoDs were male, while 44% were female and 10% of the HoDs did not indicate their gender. Study findings were analysed using Statistical Package for Social Sciences (SPSS) version 23.0. This paper is an exposition of the Kenya's Educational response to Environmental Sustainability.

Rationale

Kenya has made efforts in integrating Environmental Education in the mainstream system in line with the ESD. Currently, Environmental Education (EE) is integrated in different

levels of education. At early childhood education level, EE is integrated in the curriculum using a thematic approach. At the primary and secondary school level, environmental issues are mainstreamed in the existing subjects, mainly science, social studies and geography using a multidisciplinary approach. All teacher-training colleges currently offer courses in EE. The same case applies to university level education where faculties of Environmental Studies exist. Most universities as already stated teach Environmental Education as common course. As a result, the subject does not draw a lot of attention from both the teachers and students. In a study by Kimaryo, (2011), teachers reported that the approach used to integrate environmental education into the school curriculum was not appropriate since the methodology is not well demonstrated. The existing curriculum also focuses more on theory work, with minimal practice.

In addition, the methodology for delivering the environment education is not outlined in the curriculum. Kimaryo, (2011), report indicates that although most teachers said that they used participatory methods, lesson observations showed that they limited themselves to question and answer, and group discussion. However, the teachers reported that they faced a number of barriers in the teaching of environmental education, some of which included lack of teaching and learning resources. There is therefore need to review the existing education curriculum to provide the teachers with clear guidelines on the methodology that can be used in delivering the environmental values education. With the many gaps in delivering environmental values through the education system in Kenya, a big part of the population lacks the values. There is therefore need to develop a curriculum that addresses the identified gaps and props Kenya to meet Agenda 2030 Sustainable development.

In view of Agenda 2030, Sustainable Development is to ensure a mental shift to enable the populace play an increased role in Environmental sustainability according to UNESCO 2016 which proposes-

i.that, Education helps people to understand and respond to environmental issues through such approaches as- creation of accurate knowledge, skills and technical solutions that can alter environmental behaviour; becoming a tool for climate change awareness, green schools curricular that addresses environmental issues accurately and adequately, and hands - on learning outside school which provides a connection with nature.

ii.that, Outside school learning of environmental issues, should involve experiential activities with the Community. The learning through communities encourages people to reflect on the values they hold and participate more actively in sustainable living. Participation among community members is likely to lead to passing down of indigenous knowledge across generations on climatic change. Providing instruction in local languages helps in knowledge creation, which in turn is shared across generations and communities.

iii.that Education systems exercise caution to not encourage unsustainable lifestyles - like teaching and learning for economic growth alone without sustainable solutions

iv.that Education systems bring about critical aspects of indigenous communities which reflect respect and openness to plurality of knowledge systems and cultures.

v.that schools take a holistic approach to dealing with environmental issues in a way that they learn environmental issues, climatic change and its underlying causes. Pedagogy on environmental issues is collaborative and participatory in strategy, engages with local communities and build green operations and environments

In Kenya, the Ministry of Education has both the goals and general objectives that define the focus of the country in education achievement. Some of these deal with issues of environment, which was the focus of this study. Among the national goals of education in

Kenya, goal number 8 delineates the need to focus on the teaching of environmental Education, as it specifies the need to develop awareness and appreciation of the environment. The goal states the need to **promote positive attitudes towards good health and environmental protection. In addition**, Education should inculcate in the youth the value of good health in order to avoid indulging in activities that will lead to physical or mental ill health. It should foster positive attitudes towards environmental development and conservation. It should lead the youth to appreciate the need for a healthy environment.

The national goals are further broken down into goals and objectives in different subjects. For example, Social Sciences texts have three main goals that address issues of environment, which are further broken into specific objectives in the content and the resources used. The general objectives include

1. No. 2. Understand, use and manage the immediate environment for individual and national development
2. No. 6. Acquire knowledge of available natural resources and demonstrate ability and willingness to utilize them properly
3. No. 11. Acquire knowledge and skills necessary to understand and analyse population issues which affect the quality of life of the people of Kenya.

The goals are meant to guide teachers in replicating content that enables the achievement of these goals. The presence of these goals in the curriculum is a clear testament of the Government's intention or desire through the Ministry of Education (MoE) to have education on environment taught to Kenyan children and students. The goals clearly define the intention of the Kenya Government regarding education for its citizen; part of which includes education on issues of environment.

The Government through the ministry of education also defines the type of teacher, the content, the resources and facilities, the methodology or activities by which these goals and objectives can be attained, hence their inclusion in the national curriculum and syllabuses. As such, the attainment of these goals and objectives is determined by many factors including the content provided, the pedagogy used, the resources made available, the activities envisaged for the learners among others. It is hoped or assumed that when all these are provided for in the curriculum and then implemented in the schools, the then learners will be able to acquire the necessary education and skills as spelt out in both the curriculum and the resources used such as the teaching and learning text books made available to the learners.

Whereas this may be so, there are many factors that can hinder the successful attainment of such goals and objectives given the many factors that come into play in ensuring successful achievement of the educational goals. They include factors such as having well trained teachers who can impart these skills to the students. Thompson et al. (2013) note that teachers occupy the central position in curriculum decision making. They decide which aspect of the curriculum, newly developed or ongoing, to implement or stress in a particular.

McMillan and Gyball (2009), argue that good practice in education for environmental sustainability is what they describe as whole schools, which act as role models for sustainable development by being environmental stewards. The approach incorporates all aspects of schooling such as curriculum, extracurricular activities, teacher training, human resources, infrastructural activities and processes. However, this model has its own limitations despite being popular in England, because the practice is not adequately embraced (Hargreaves, 2008).

This paper examines the curriculum gaps that exist in the implementation of the stated national goals and objectives at the school level as envisaged by the Government. It particularly pays close attention to the interface between the stated goals and objectives in the curriculum

and the implementation of these goals through the text books used for teaching and learning for sustainable development . The paper is a presentation of findings of a survey carried out around the country among primary and secondary school teachers and students to assess the level of implementation of the goals and objectives as stated in the curriculum.

Research Design and Methodology

The research adopted mixed research design methods. Content analysis of the curricula and surveys was conducted. The survey with key informants provided a basis for evaluating the curriculum and proposition of revision of the same To assess the adequacy of the curriculum for Sustainable Development a Framework was adopted. The framework acknowledges that knowledge involves providing information, facts and skills in the disciplines of natural, social sciences and humanities to understand the tenets of sustainable development and their implementation. The model suggests that learners should have knowledge on conditions and actions related to environmental sustainability which includes

1) Rates of use of renewable resources do not exceed their rates of regeneration. 2) Rates of use of resources do not exceed the rate at which sustainable renewable substitutes are developed, 3) Rates of pollution emission do not exceed the assimilative capacity of the environment.

The study population include primary and secondary students and teachers in the institutions. The other category of the population included professionals in field of environment in the government departments and Ministry of education, Kenya Institute of Curriculum Development, UNEP and Civil society.

Purposeful sampling was used to select officials from KICD, MOEST, TSC, and Civil Society Organizations in Education sector and UNEP while selection of participants from the education system, employed multi-stage sampling based on the Counties. The review of the curriculum was done through consultative processes to assess the content and values taught on education in regard environment sustainability.

Data collection involved the use of questionnaires to collect data from teachers and students while for key informants' interviews were conducted for the officials identified. The questionnaires were used to gather data on the knowledge, attitudes, values and practices applied by the students in daily life on for environment sustainability. Two interview guides were developed and conducted; one with department heads in schools to gather data on environmental content, attitudes, values and skills taught, the approaches used and the expected learning outcomes for environmental sustainability. The second interview guide was used to collect data from key informants from the following categories; NGOs, government ministries and departments, and UNEP on the learning outcomes expect from education institutions for environment sustainability.

A content analysis was done on the curriculum content, resource materials, approaches, and learning outcomes in both primary and secondary schools as well as universities to analyse values education for environment sustainability. Data from the survey was analysed using both quantitative and qualitative data analysis methods which involved using SPSS and NVIVO data processing software. Quantitative data was presented in tables and charts in percentages and frequencies, while qualitative data was analyzed and presented thematically. Following the analysis of the curriculum content against the ESD framework, the gaps and opportunities are presented in form of tables and frameworks.

Findings

Teaching and learning of Environmental Issues

Students in both primary and secondary schools were asked to indicate whether they had been taught about environmental issues. As shown in Fig.1

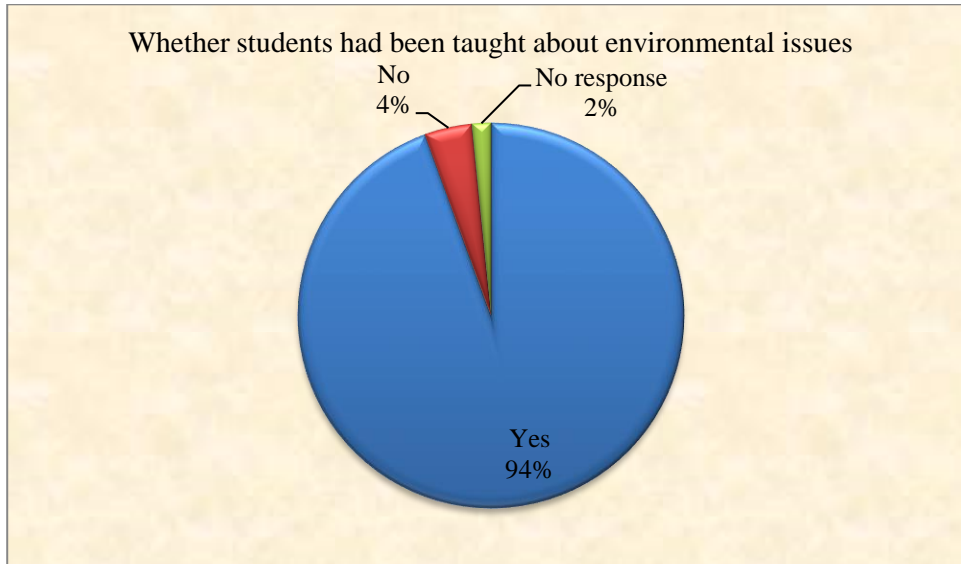


Figure 1: Whether Students Had Been Taught on Environmental Issues

Close to all students at 94% accepted that they had been taught environmental issues with only 4% indicating that they had not been taught on environmental issues. This finding demonstrates that students indeed are knowledgeable on environmental conservation and therefore are better placed to inform this study on environmental education Curriculum for sustainability.

In addition to questions on learning environmental issues, students were also asked if they had learnt enough on environmental conservation as shown in Fig. 2. A total of 43.4% of the students confirmed that they were taught enough about environmental conservation while 51.8% indicated that they had not been taught enough about environmental conservation. It is important to note that a significant percentage of the children are yearning for more content and instruction on environmental matters. The findings are presented in Figure 10. It is not surprising that more than slightly over 51% felt they had not learnt enough of the environment matters since persons increase chances to express concerns for environment as they progress across the education ladder from primary, secondary and tertiary (Franzen & Vogl, 2013). It is observed that environmental concerns actualize over schooling as values are learnt and students develop a sense of space, in the process of bonding with nature and developing of competencies.

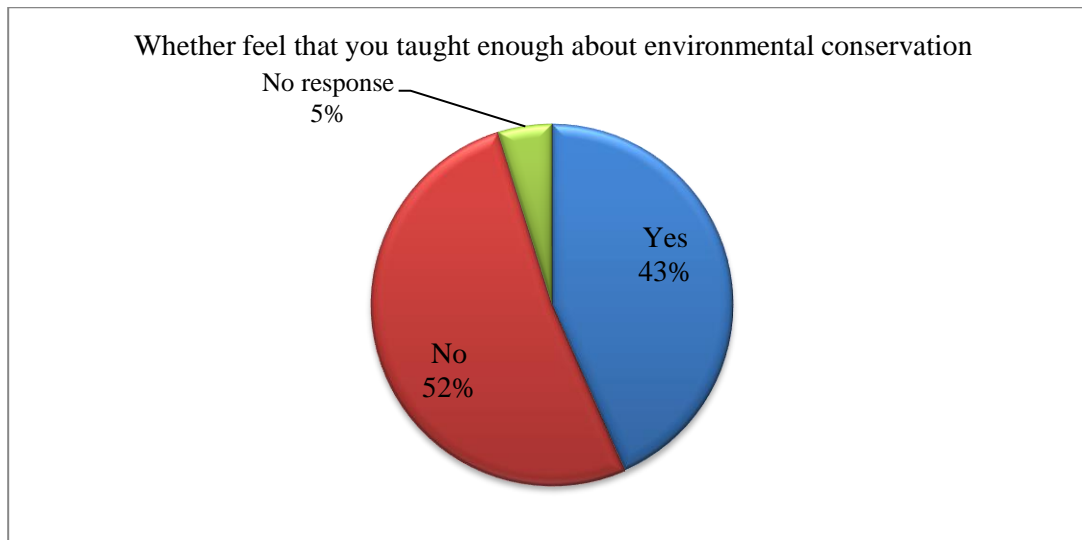


Fig. 2: Whether Students felt they were taught enough about Environmental conservation
When asked who taught them, as shown in Table 1

Table 1. Persons Who Taught Students on Environmental Environment Issues

Who taught students on environmental environment issues	Frequency	Percentage (%)
Teachers	2380	78.1
Parents	418	13.7
Bother/sister	33	1.1
Church	30	1.0
Friends	10	.3
Others	20	.7
No response	158	5.2
Total	3049	100.0

The majority of them at 78.1% asserted that they had been taught by their teachers, 13.7% indicated that they had been taught by the parents, 1.1% said they were taught by brothers/sisters, 1.0% said they were taught at church, while a few at 0.3% said they were taught by friends. These findings infer that environmental challenge is multifaceted and ought to be addressed by all stakeholders. Knowledge ought to permeate to all concerned. suggest that teachers are the most significant source of learning on environmental issues. It is worth noting that a good number of students indicated that they had not been taught and as such could not conserve the environment. Interview responses from heads of departments in both primary and secondary school indicate that 59% had no training on environmental issues, which implies that they are not likely to adequately train on environmental issues for sustainability.

To investigate whether issues on environmental education and sustainability were found in school textbooks, students were asked whether there are books in their schools that talk about environmental conservation. The findings revealed that approximately 96% accepted there were books in their schools that talk about environmental conservation, 1% responded to the contrary, while 3% did not respond to the question. These findings indicate that there is

educational curriculum focus on environmental conservation from students' perspective. The subject matter on environment is integrated in texts as shown by 81% of students who indicated that environmental content is found in science books 12.6% reported that other subject books, as shown in Fig. 3.

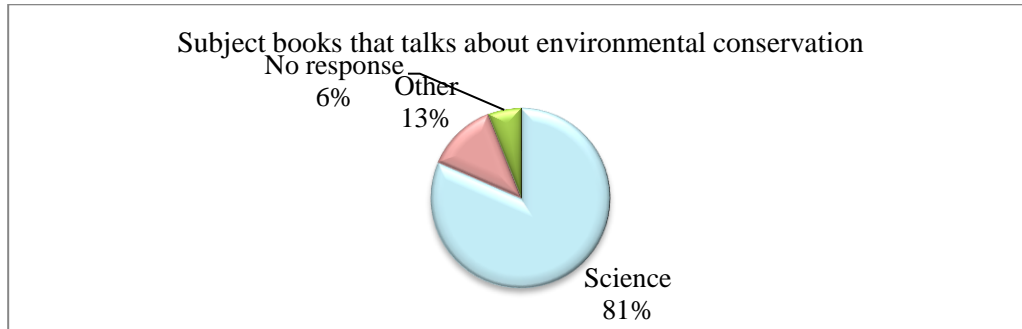


Fig. 3: The Subject Books that Talk about Environmental Conservation

Environmental Content in Textbooks

Content analysis was conducted on text books recommended by KICD for schools across subject areas regarding environmental education and sustainability. The findings as shown in Fig. 4 revealed that approximately all students at 96% accepted that there were books in their schools that talk about environmental conservation, 1% responded to the contrary, while 3% did not respond to the question.

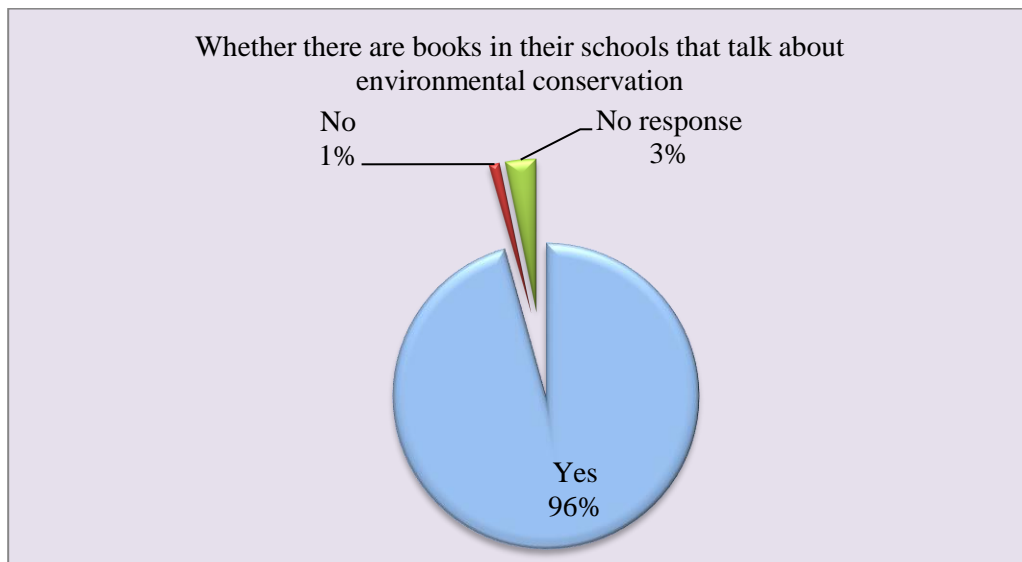


Fig. 4: Availability of Books in Schools that Teach about Environmental Conservation

When asked to name the books, as shown in Fig. 5 the results showed that majority of the students at 81.5% said that science books are the ones that talk about environmental conservation, 12.6% said that other subject books talk about environmental conservation, while 5.9% did not say anything regarding subject books that talk about environmental conservation.

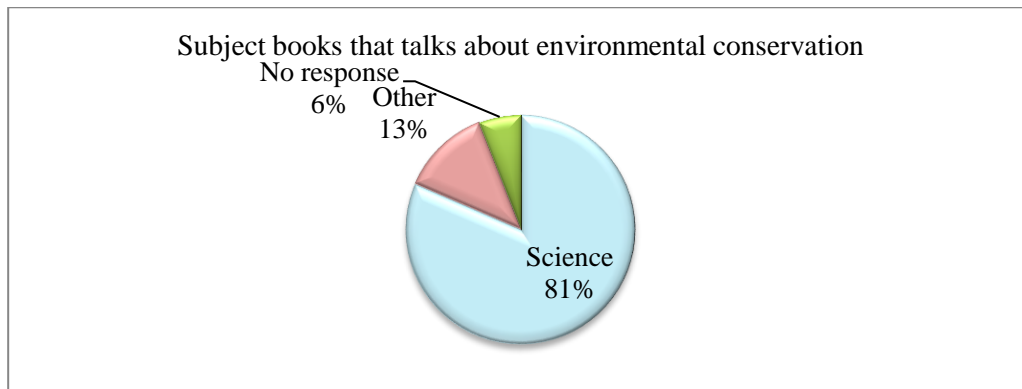


Figure 5: The Subject Books that Talk about Environmental Conservation

The textbooks analysed for environmental education and Sustainability was conducted curriculum was further done and it revealed that environmental topics were covered in varying degrees in different text books and also more teaching on environment education takes place more in Primary schools as shown in Table 5

The findings in Table 4 showed that environmental conservation was taught more at primary level (65.7%) compared to the same teachings at secondary level (16.5%). Impact on character and value formation is more likely to be effective at younger ages. It is therefore good to note that most of the teaching of environmental aspects occurs at formative years in school.

Table 5:
Class or Form Taught more about Environmental Conservation

Class or form taught more about environmental conservation	Frequency	Percentage (%)
Class 5 and below	473	15.5
Class 6,7 and 8	1531	50.2
Form 1 and 2	576	18.9
Form 3 and 4	232	7.6
No response	237	7.8
Total	3049	100.0

Furthermore, text books were examined for content on environmental education against the backdrop of what the students indicated regarding the classes where they were taught and the books that they found to contain environmental education.

Core textbooks were sampled for analysis in relation to environmental education and sustainability in terms of goals, content and learning activities. A few examples are analysed to demonstrate this. 'Understanding Science pupil's book 6' was found to have dedicated 10 pages to environment, by covering topics such as soil erosion; types, factors and how to prevent it. It ends with some questions. The methodology used is both presentational and practical with examples the pupils can relate with. Compared to what the curriculum stipulates, this is a small fraction of what should be covered in that class. The curriculum requires coverage of topics such as to:

1. Explain the impact of industries on the environment
2. State the meaning of wildlife conservation

3. Discuss wildlife conservation measures
4. State the problems facing urban centres
5. Identify the efforts being made to solve problems in urban centres
6. Appreciate efforts being made to solve problems in urban centres good.

The curriculum therefore stipulates more content than what the textbook has captured.

Another book that was examined, “Our Lives Today Social studies 5 Oxford, dedicates sections on soil, vegetation, forestry and wildlife conservation. Another sampled core textbook was ‘Our Lives Today Social Studies 7 by Oxford’, which covers topics on forestry, how the school can engage with the community, and effects of mining on environment. Yet another example (3): tackles sections on causes of soil erosion in Kenya, (P. 36), effects of soil erosion on human activities, (P. 36), soil conservation, (P. 37), Forestry (P. 114) Soil, (P. 116), Problems facing forests in Kenya, (P. 117), effects of deforestation, (P. 118), forest conservation measures, (P. 120), Activities. Other topics covered include Industries (P. 126), effects of industries on the environment, (P. 134) and then activities etc.

On examining the curriculum for these classes, it is noted that the objectives the study on environment. For example; The standard 5 syllabus expects the learners to be equipped with skills such as, Physical environment, (P. 21), main physical features of Kenya, (P. 22) , Location of the main physical features, (P. 22), Influence of physical features on human activities, (P. 22), Causes of soil erosion and Forestry (P. 26), Types of forest, (P. 26) Distribution of forests, (P. 26), Importance of forests; Wildlife and Tourism (pp. 26-P 27), National parks and game reserves, (P. 27), Importance of wildlife, (P. 27), Problems facing wildlife, (P. 27), Meaning of wildlife conservation, (P. 27), Efforts in conserving wildlife, (P 27), Main tourist attractions in Kenya, (P. 27), Importance of tourism and Problems facing tourism (P. 27).

For standard six, learners should be exposed to factors influencing vegetation distribution in East Africa (P. 33), Wildlife (P. 38), Wildlife conservation measures (P. 38), Problems of tourism and Mining (pp. 64-65), Effects of mining on the environment; Forestry (p. 65), Problems facing forests (p. 65), Effects of deforestation (p. 65), Forest conservation measures (P. 66), and Effects of industries on the environment. Under courses on mathematics, there was almost nil content on environment, meaning that some text books did not carry any topics or had very little content on environment. These examples concur with the findings from students where 96 % said that some text books contain topics on environment. To this end therefore, the findings show that the objectives in the curriculum are cascaded into the textbooks to a large extent in varying degrees according to different texts with more topics being covered in sciences and social sciences. There are also textbooks that have nil content on environment, while others have very little; sometimes as little as even a page or less.

The findings in the textbooks confirm what the students reported in the survey that 50.2% were taught more about environmental conservation at classes 6, 7 and 8, and 18.9% at form 1 and 2, while 7.6% said they were taught more on environmental conservation at Form 3 and 4. The findings from the analysis of textbooks concur with the survey findings that environmental conservation was taught more at primary level (65.7%) compared to the same teachings at secondary level (16.5%). As indicated, the analysis of textbooks revealed that a number of primary school books significant topics on environment, which implies that nearly half of the student population were exposed to environmental education in Primary school, while others had zero content on environment.

Analysis of Teaching Methodology of Environmental Education for Sustainability

An examination of the curriculum reveals that a number of teaching techniques are recommended. The Primary education social studies syllabus lists methods such as, discussions, asking questions, observing, story-telling, role play, debate, field visits, drawing, demonstration, nature walk, modelling, dramatizing, singing, dancing, planting, note making/taking, classifying, counting, reciting, problem solving, simulation, measuring, reading and games. Out of these, some textbooks have employed activities such as, field work (especially Geography), debates (e.g. Social studies- where a motion on “Mining causes more harm than good to a country” is given or they are asked to simulate parliamentarians and enact laws on issues of environment. Another example of debate can be found in in the book, ‘Our lives today: Social studies (p.111) where it proposes the motion that “Mining causes more harm than good to a country” in this view students are able to gain their own perspectives and can impact reclamation where there is need

Another technique is the use of discussions. In the book ‘Our lives Today’ students are given two activities such as 1. Identify the ways in which soil has been conserved in their area and 2. Discuss with your classmates how you would stop gully erosion in an area. This exposure is useful in creating awareness and action related to soil conservation. Observation methods are also used when students are required to walk around the school and observe activities such as cutting down trees, clearing of vegetation, open fires. The textbooks also suggest the use of projects. Other examples given include practical ones where pupils are (for example on p. 120) asked to plant some tree seedlings on their farms or in the school compound. These aspects of education are intended to create awareness and sustainability behaviour. The learners are told to take care of the seedlings by watering them and protecting them from destruction by animals such as cattle. These are followed by a form of assessment, in which they explain the meaning of certain terms related to environment, for example, name two forests, explain four problems that face forests in Kenya, state three effects of deforestation and explain five forest conservation methods. After these activities, they are given quick revisions that enable them to internalise whatever they have learnt (An example is on page 121). The books containing the content and activities are by Oxford University Press.

Primary science 7: Pupils’ book for std 7 by Kenya Literature Bureau gives a section on work to do. The students are asked what problems are experienced in areas that lack water; in another example they are asked to write notes to explain a statement, or to take a walk and observe various human activities that affect soil, and especially look for activities such as cutting down trees, clearing of vegetation and open forest. Regarding observation method, primary Science 8 p. 106 suggests requires students to ‘observe the effect of air pollution on animals, others ask them to discuss ways and others to simulate parliament enacting laws to safeguard the air that citizens breathe. This is followed by assessment where students define, name, explain, give examples etc, exercises that enable them to think about what they have learnt.

Other very interactive activities include those where students are involved in activities such as collecting and preparing seedlings for planting, transplanting tree seedlings, selecting an appropriate site for a tree nursery, pruning and thinning trees and harvesting trees, constructing various designs to conserve soil (Bk.3, p. 191) etc. The English syllabus has organised the environmental content around themes such as enabling the learner to acquire vocabulary relating to their environment, realizing the need to take care of our surroundings, appreciating the importance of conserving and caring for the environment to name just a few.

To achieve these themes, the text books contain activities such as developing vocabulary and sentence structures relating to our environment. They are taught through listening and speaking, reading and writing.

As indicated earlier, there are other textbooks with nil content on issues of environment and this can be explained by the fact that the curriculum for the same classes has no content on environment issues. An example is CRE std 1, 4 and 5,

A look at some secondary school books revealed use of techniques such as fieldwork (School Certificate Geography 1 for form 1: Pupils book, p.126, Book three suggest field work (p.223,) where the students are supposed to study a significant land forming process within the environment (p. 242) where they carry out a field study on causes of soil erosion in a region near their school. These are followed by revision questions in which they explain, illustrate, and state ... on issues to do with what they have learnt.

Secondary Agriculture suggests practical activities such as collecting and preparing seedlings for planting, transplanting tree seedlings, selecting an appropriate site for a tree nursery, pruning and thinning trees and harvesting trees. This is followed by revision questions on the topic (Secondary Agriculture: Form four students' book, p.217). The agriculture text books involve students in visiting sites where they observe in real time the implementation of things they have learnt (book 3, p. 191), practical activities such as constructing various designs to conserve soil ...Bk.3, p. 191) where they practice some of the things they have learnt and this is always followed by revision exercise. Chemistry has very little content and suggests the use of project-to find out about environmental effects of burning different fuels followed by a revision exercise (secondary chemistry: form four, p.57-58).

These few examples are sampled to show that an attempt is made in the textbooks to incorporate teaching techniques as stipulated in the curriculum. Finally, almost all the activities are followed by different forms of assessment that are either individual or group related, the assessment suggest an examination centered approach to teaching instead practical approaches (learning by doing) that would enhance acquisition of attitudes and behaviour necessary for environmental sustainability.

From the learning resources recommended, it was envisaged that some behavior change was to be tested and this was possibly to be observed as part of learning resources for teaching and learning such as text books and other print resources, visual resources- maps, pictures, three dimensional models, graphic resources, weather station, realia, the field, display boards, use of resource persons, Cassettes, and radio broadcasts. These were difficult to assess from the text books.

According to Alexandar and Poyyamoli (2010), active participation of learners is more effective in facilitating environmental education for sustainable development among school children. The active teaching and learning methods involve students in learning processes such as discussions, writing, asking and answering questions and engaging in their own learning, problem solving among others; the approaches require students to use critical thinking skills such as analysis and evaluation. The kind of methodology used also determines the acquisition of skills on environment. A study by UNESCO (2012a), espouses the kind of methodologies that can lead to behavior change as those that involve discussion, analysis, use of arts, drama, play, music, design and drawing to stimulate creativity and imagination.

Indicators of Environmental Education for Sustainability

The survey done among HODS, indicated that 82.4% of the HoDs agreed that their schools had activities on environmental awareness while 12.6% indicated that their schools did not have such environmental activities. Based on these findings, it can be seen that there is environmental education and environmental values such as conservation are taught. The report by heads of department is an indication that largely environmental education is taught in most schools and that majority of those schools have activities on environmental awareness.

An overall examination of Primary and Secondary school text books indicates that in primary school, content on environment was scanty across textbooks and in methodology. The analysis of secondary school textbooks revealed that Geography, C.R.E, Biology, Agriculture, Business studies, Chemistry and Physics contained some content on environmental Education in varying amounts.

Environmental education for sustainable development was not consciously and explicitly stated in the objectives of both primary and secondary curriculum and textbooks. The syllabuses focus mainly on knowledge-based learning. On skill-based learning on environmental values: there are no explicitly stated objectives relating to values and attitude change. Some of the learning activities stated in the textbooks may lead to environmentally sustainable values and behaviours, especially those that involve engaging the learners in practical activities. Besides, the content as expressed is teacher centered in terms of what the teacher will teach and not focused on student learning outcomes.

Environmental Education for Sustainability findings Report from stakeholder external from Schools

Findings from Ministry of Education, National Environment Management Authority and United Nations Environment Program (Kenya) showed aspects of environment content incorporated in primary and secondary curriculum while United Nations Environment said schools engage in environmental sustainability in an informal approach. Their view is that most curriculums deal with environmental values minimally and insufficiently.

On policy, the ministry pointed out that there are not enough policies to address the inclusion of curriculum and environmental values. NEEMA and UNEP indicated that there are policies and efforts at their level but these are not integrated in school. Education for sustainable development policy 2010 by Kenyatta University, UN decade on education for sustainable development, MoE, NEEMA, have some initiatives to inculcate environmental values among pupils and students which included, clean up days, tree planting sessions, races meant for conservation; drama competitions which address issues of conservation, and existence of environmental clubs in certain schools to nurture environmentalists and future conservationists. All three institutions confirmed that teachers are not well equipped for environmental values for sustainable development. There are no conclusive initiatives for environmental sustainability values teaching and practices in schools, KICD has improved curriculum through KICD in the early years of education in PP1, PP2 and PP3. The institutions recommended integration of environmental courses and subjects in all schools' curriculum and capacity building and empowerment of relevant institutions mandated to spur environmental values amongst students.

Furthermore, findings from National Environment Management Authority (NEEMA) and Ministry of Education (MOE) revealed that despite having some initiatives to inculcate environmental values among pupils and students which included clean up days, tree planting sessions, classes meant for conservation; drama competitions which address issues of

conservation, existence of environmental clubs in certain schools to nurture environmentalists and future conservationists, the teachers are not well equipped for environmental values for sustainable development.

From the research carried out among heads of departments and teachers, it was evident that majority of the HoDs levels of education helped them understand environment's issues and thus could tell the link between education curriculum and environmental issues. Fig. 5 demonstrates the levels of their education.

Level of Education of HoDs

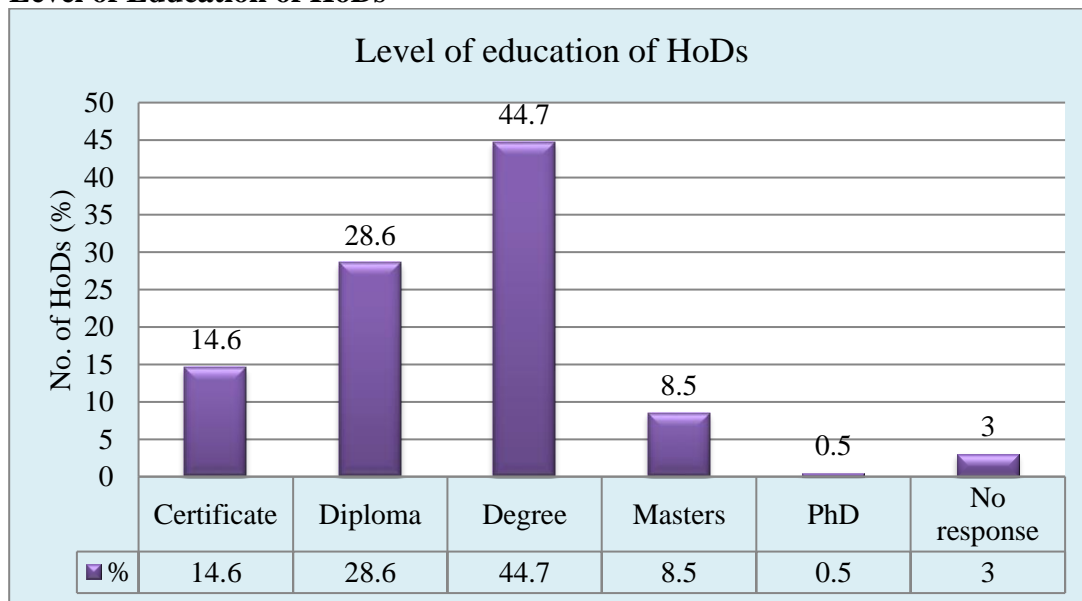


Fig. 6: Level of Education of HoDs

From the findings in Fig. 6, HoDs (44.7%) are degree holders, followed by 28.6% who had obtained education up to diploma level, while 14.6% who had acquired education up to certificate. The HoDs who obtained postgraduate education were 8.5% at Masters Level and 0.5% at PhD level. These findings show that majority of the HoDs were learned people who probably understood environmental issues thus could tell the link between education curriculum and environmental issues.

The findings from the HoDs indicated that teachers had been trained on environmental issues in addition to their academic qualifications, some (37%) of the HoDs had been trained on environmental issues, while others (59%) had not been trained. A few (4%) did not indicate whether they had been trained on environmental issues or not. With 37% of the HoDs having been trained on environmental issues; Also (41 out of 71) of the HoDs who indicated that they had been trained on environmental issues were bachelors' degree holders compared to 7, 18, and 5 who had attained education up to certificate, diploma, and matters level respectively. The low levels on teachers training on environmental issues suggest the learners at both primary and secondary schools are poorly equipped for environmental sustainability.

Table 5:

Cross-tabulation: Level of Education of HoDs Training in environment issues*

		Training in environment issues		Total
		Yes	No	
Level of Education	Certificate	7	21	28
	Diploma	18	34	52
	Degree	41	47	88
	Masters	5	12	17
	PhD	0	1	1
Total		71	115	186

The study findings in Table 5 imply that in higher education curriculum, environmental values are taught more at undergraduate level compared to other levels such as certificate, diploma, Masters, and PhD levels. This could be attributed to the extensive coverage of many educational units at undergraduate level compared to other levels in higher learning. This goes contrary to the age at which environmental values can be instilled typically at younger primary and secondary school going age. This could be one of the major gaps as far as instilling environmental values is concerned. The findings in Table 5 above that in higher education curriculum, environmental values were extensively taught or the teachers were trained at undergraduate level compared to other levels such as certificate, diploma, Masters, and PhD levels. This could be attributed to the extensive coverage of many educational units at undergraduate level compared to other levels in higher learning.

It is also worth noting that qualification and motivation were key factors in students learning. The findings in Table 6 show that 78.9% of the schools have specific qualified teachers assigned as patrons to the different clubs dealing with environment while 19.6% of the schools do not have such teachers. However, most (56.3%) of the HoDs denied that teachers are motivated in teaching environmental conservation values, with only 12.0% of the HoDs agreeing to the same. These findings affirm that majority of the schools have the potential to promote environmental conservation values through qualified teachers assigned as patrons to the different environment activities within and outside schools. However, to effectively tap the potential of schools to promote environmental conservation values, teachers need motivation since the findings indicate that there is lack of motivation among teachers to in teaching environmental.

While as reported earlier the Ministry of Education, National Environment Management Authority and United Nations Environment Program (Kenya) showed aspects of environment incorporated in primary and secondary curriculum, the United Nations Environment said schools engage in environmental sustainability in an informal approach. Most curriculums deal with environmental values minimally and insufficiently as already said. On policy the ministry pointed out that there are not enough policies to address the inclusion of curriculum and environmental values. NEEMA and UNEP indicated that there are policies and efforts at their level but these are not integrated in school. Education for sustainable development policy 2010 by Kenyatta University, UN decade on education for sustainable development, MoE, NEEMA, have some initiatives to inculcate environmental values among pupils and students which included, clean up days, tree planting sessions, races meant for conservation; drama competitions which address issues of conservation, environmental clubs also exist in certain schools to nurture environmentalists and future conservationists. All three

institutions confirmed that teachers are not well equipped for environmental values for sustainable development. There are no conclusive initiatives for environmental sustainability values teaching and practices in schools, KICD has improved curriculum through KICD in the early years of education in PP1, PP2 and PP3. The institutions recommended integration of environmental courses and subjects in all schools' curriculum and capacity building and empowerment of relevant institutions mandated to spur environmental values amongst students.

Conclusion

Analysis of text books and the curriculum confirmed a lot of what students had said in the survey, namely that they had been taught environmental education and that the books containing such content were mainly science books. Text books cover some topics on environmental education scantily, in theory and with minimal practical learning. It also revealed that a lot of environmental content was taught more in Primary schools than secondary schools, and in secondary schools the content was found in form 2 and three books.

Teachers in both primary and secondary school are largely ill trained and lack unmotivated to teach environmental issues. Additionally, nearly half of the head of departments have no knowledge of environmental education.

KICD has made some initiatives for early years teaching of environmental values. KICD recommends teaching of environmental values teaching in all schools with each subject integrating environmental values and its importance in the country and the world. UNEP recommends a lot to be done in subject matter to entrench environmental conservation in the country by entrenching of Sustainable Development Goals (SDG) and other UN addressing the issues of environment in the curriculum. Furthermore, UNEP emphasized as a matter of necessity that teachers are trained in areas of conservation to be able to pass the same knowledge and skills to their students. Among the recommendations by UNEP was also the need to build teachers capacity and empowerment by use of relevant institutions mandated to spur environmental values amongst students

Recommendations

1. Intensive Environmental knowledge, skills and values should be taught at all levels of teacher Education and a practical approach should be employed.
2. All subject areas in both primary and secondary education should have appropriate environmental knowledge, skills and values Education
3. Environmental values should be taught both in theory and practice and also be evaluated, all content analysis did not address attitudinal outcomes of learning and thus this should be addresses
4. The content in the syllabus for schools should be adequately captured in scope in KICD approved text books used in schools
5. All environmental stakeholders in Environmental Education NEEMA, UNEP, Ministry of Education and KICD should contribute towards Environmental values education for Kenya to achieve the expected international
6. should inform the Curriculum in both primary and secondary school in terms of policy teaching and learning
7. Both the syllabus and the textbooks indicate a teacher centered approach to learning yet for sustainability skills and attitudes to be achieved, the curriculum design should be learner centred.

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