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Original Research Article

Assessing the factors influencing effectiveness of environmental programmes in secondary schools in Muranga County, Kenya

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Experiential environmental education programmes have been initiated in Kenyan school to counter environmental degradation and give students hands-on experience. The experiential programmes aim to stir a love for nature and change the students' attitudes and behavior to be pro-environmental. This study assessed factors that influence the effectiveness of such experiential programmes and the institutional and policy frameworks on which they are anchored. 961 students from 19 high schools from two sub-counties in the County were used in the study. A Likert-type questionnaire for students and a key informant interview guide for Principals and teachers were used to collect the required data. The t-test statistic was applied to determine any differences between the variables, with significant differences in pro-environmental attitudes and behavior between members and non-members of experiential environmental clubs with respect to solid waste management (p=0.044), water resources management (p=0.089), and natural resources management (p=0.000). The study concluded that the experiential environmental programmes improved the student's pro-environmental attitudes and behavior and hence environmental management within the schools. They however lack the requisite institutional and policy framework to support them to enhance environmental literacy. Appropriate policies and institutional frameworks should be formulated to enhance the implementation of school experiential environmental programmes.

Keywords: Environmental education, experiential policy, kenya, learning experience, secondary schools

INTRODUCTION

Environmental degradation is a growing concern, with human action being at the heart of environmental issues. Degradation has also been closely tied to a long-standing decline of environmental values from the human value system which means it can also be reversed by changing relevant human behavior. The adverse effects will continue to increase exponentially as a result of economic development and the human industrial development (Habibie, 2020). Sustainable development ultimately depends on changing human behavior (Zelenika et al., 2018).

Changing human behavior requires increased environmental education, as a first step to addressing the challenge, since environmental stewardship starts with education (Shaari, 2016 and Godwell, 2011). Environmental education is thus a catalyst for the needed

change, and a primary means of achieving environmental protection (Sharma, 2016 and Kaur, 2020). Environmental protection starts by creating awareness through environmental education, and helping people understand attendant environmental problems, the underlying causes, the manifestations and impact of these problems, so that there are concerted efforts not only to alleviate and solve the existing problems but also to prevent their recurrence (Sandhu, 2015).

Educational institutions play a significant role in shaping individual attitudes, cultivating healthy habits and imparting different types of skills (Kaur, 2020). They are, therefore, key in inculcating values of education and related practices so as to develop future responsible citizens (Anbalagan and Viswanathan, 2015).

Not all environmental education programmes have, however, been effective in achieving the goal of assisting learners become environmentally literate, which requires one to go beyond knowledge and attain new attitudes and subsequently intentionally facilitate behavior change (Guion, 2015). Kollmuss and Agyeman (2002) argued that environmental information and knowledge does not lead to pro-environmental behavior in linear progression. There is thus a disconnect between knowledge and action; and a gap between knowledge of environmental education, and the motivation to participate in environmental management (Mutisya and Kirui, 2013). New methods and strategies are therefore required to facilitate behavior change (Guion, 2015) as the traditional form of education may not be sufficient to overcome the current challenges of environmental degradation (Loubser, 2012).

Among the strategies proposed is that Environmental Education (EE) should be more "*hands-on*" to create more consistent behavior in protecting the environment (Hassan, 2019). This is because classroom activities have limited ability to change some components of environmental learning, notably emotional connection to the environment (affect) and environmental behavior. Duerden et al. (2013) found that classroom activities were associated with improved environmental knowledge whereas field experiences were correlated with improved affect, which indirectly improved behavior by activating knowledge. Adnyana and Sudaryati (2022) also found that the concept of green education which develops a learning model focusing on alignment and integration of environmental management led to improved ecological attitudes, values and knowledge in conservation efforts among leaners.

To reinforce the action and experiential component of environmental education, and to boost environmental literacy and pro-environmental behavior, several experiential programmes are run in schools through clubs and societies. Most of these environmental education programmes are non-formal and voluntary. Such programmes include Boy Scouts and Girl Guides; Wildlife Clubs; 4K clubs; Green schools; and Environmental Clubs. These programmes aim to reinforce what has been learnt in class and to create positive perceptions and attitudes regarding nature, and the environment (Korkmaz, 2018).

Despite their use in promoting environmental literacy, the characteristics and factors that influence effectiveness of the school environmental programmes have not been assessed in Schools in Kenya and in Muranga County in particular.

Study Area

The study sites were located in two sub-counites in Murang'a County, one of the 47 counties in Kenya. The County was selected because learners here have a higher chance in engaging in environmental management activities. The site also gives two different eco-systems – one that is semi-arid in the lowlands, and another that is humid in the highlands, which mirrors the Kenya country context with regards to highlands and Arid and Semi-Arid lands (ASALs), meaning that study results from the study can be cascaded to reflect the situation in the country.

METHODOLOGY

The research was undertaken in March and April 2022 just before the Covid pandemic struck. Qualitative methods were used in the review of strategies and factors that have made school environmental education and experiential programmes to work. Qualitative methods were also used in form of key informant interviews targeting school Principals, teachers and club patrons, and education and environmental officials in counties, and with national government officers. Qualitative tools in form of an interview guide, were also used in undertaking Focused Groups Discussions (FGDs) with Clubs and Society's members in the schools.

Quantitative methods were used to assess the effectiveness and conservation influence of school environmental programmes. The study sample was drawn from 19 secondary schools, of which 9 were from Kahuro (in the highlands) and 9 in Murang'a South (in the ASALs) sub-counties. The total number of students sampled were 961, of which 423 from Kahuro and 538 from Murang'a South. In terms of gender, 565 were female while 396 were male. A tailored questionnaire used was based on the Environmental Attitude/Awareness Scale of Hassan Taj Environmental Attitude Scale; and the "Attitude Scale for Environmental Issues" developed by Saraç and Kan (2015). The "t-test of independent groups" was used in the comparison of two groups (those participating in experiential programmes and those who do not; those from Murang'a South and Kahuro; Male and Female; and those who had participated in Environmental Clubs before and those who had not).

RESULTS AND DISCUSSION

Current and Past membership in Clubs

There was good student membership in clubs and societies with an environmental component among the students sampled, with 51% of students being members, while 49% were non-members as shown in Table 1 below. With regard

Table 1. Membership of Students in School Clubs and Societies

Name of Club and Society	% of Students in the Club and Societies	% of sampled students
Scouting	23.4	12.0
Wildlife	22.2	11.3
Environmental Club	21.6	11.0
Young Farmers/Agriculture	19.1	9.8
Geography Club	13.8	7.1
School Greening	5.5	2.8
Health Club	4.9	2.5
Tourism Club	3.7	1.9
Peace Club	2.7	1.3
Red cross	3.7	1.2
Nutrition/Home makers	1.9	0.9
4K	1.4	0.7
Presidential Awards Scheme	1.4	0.7
Science/STEM	1.4	0.7
Business/Entrepreneurship	1.1	0.5

Source: Field data, 2020

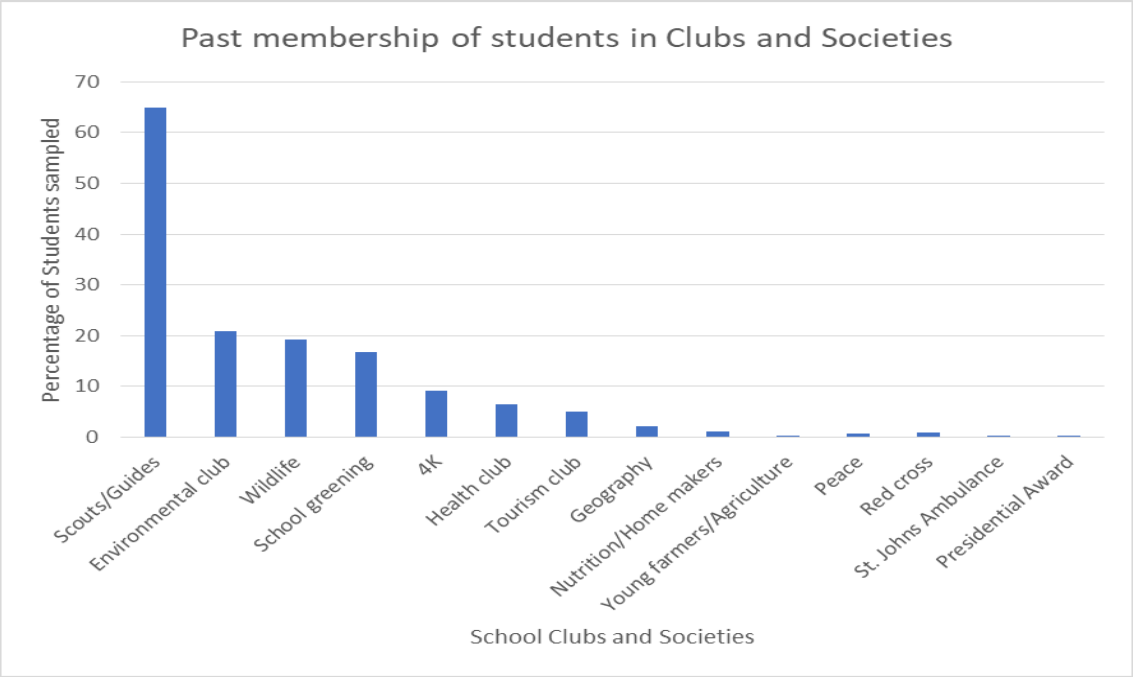

Figure 1: Past Membership in Environmental Clubs (Source: Field data, 2020)

to gender, 52.9% of male students are members of environmental clubs while female membership stood at 48.9%. Membership of clubs and societies was voluntary in most schools. Students are usually attracted to those Clubs and Societies that are active and this is the main reasons that would explain the student membership in the experiential environmental programmes. Activity in the Clubs and Societies depended on school support, with regards to having a Club Patron (usually a teacher) who was active and supportive, and financial and material support from the school administration.

Scouts had the highest percentage of participants at 23.37% of student members and about 12% of all students sampled; flowed by Wildlife clubs which had 22.15% of environmental club members and 11% of all students sampled. Environmental clubs followed with 21.6% (11.0% of all students), with Young Farmers next at 19.1% (this was higher when combined with 4 K clubs bringing the total to 20.53%). Other main clubs were: School Greening; Health club; while the smaller clubs included the Presidential Awards Scheme, Red Cross, and Peace Club, who were all engaged in some environmental activities.

With regards to past engagement with environmental clubs, 67 % of the students sampled had participated in environmental clubs before as shown in Figure 1 above of these, 29.9% were members of an environmental club

Table 2. Individual Students Gains from Membership of Environmental Clubs

Nature of individual gains from club membership	% of School Club members	% of Sampled students
Get skills that can be used later in life	57.11	29.2
Going for trips/visits	26.22	13.4
Opportunity to undertake environmental conservation	25.81	13.2
Opportunity to appreciate nature	25.0	12.8
Opportunity to teach community	22.15	11.3
Raising environmental awareness	18.29	9.4
Getting recognition	4.88	2.5

Source: Field data, 2020) Source: Field data, 2020

Table 3. Students Reasons for Not Joining Environmental Clubs

Reason for participation	% of Environmental Club members	% of Sampled students
Not interested	23.3	11.3
Clubs not active	36.4	17.7
Busy with studies	28.5	13.8
They are not helpful	4.9	2.4
They are not compulsory	24.6	12
Form fours not allowed	4.1	1.9
Lack of time	0.43	0.2

(Source: Field data, 2020)

before but were currently non-members. On the other hand, 13.8% of the students were currently members of an environmental club but were hitherto non-members.

Characteristics and Attributes of Environmental Education Programmes

All the secondary schools sampled had Clubs and Societies as part of extra-curricular school activities. With regards to those which have environmental activities, the most common clubs were Scouting, 4K and Young Farmers Club, Peace Club, Environmental clubs, and Science clubs. Majority of schools sample gave an average of an hour for weekly or bi-weekly meetings. Club membership ranges from 15 – 80 students.

The initiative of starting and running clubs is mainly with the Principal and Patron teachers of the various clubs. Most of the clubs run through students' contributions (most range between Kshs 20 – 100) with the School Administration only coming in when they go out for trips by offering transport and lunches. For clubs like Young farmers, the schools also provide inputs like fertilizers, and seeds. However, in cases where there is some income generation for example with Young Farmers Clubs, some of the schools may provide the inputs and subtract this from incomes raised when purchasing foodstuffs from the clubs.

Some school clubs get support to implement their activities from the School's Alumni Organizations which contribute to some school activities like tree planting and greening. Other support is from the neighboring tea and coffee factories who also support some schools in greening activities.

Among the students participating in environmental programmes, most would clearly point out the individual gains they derived from being members of the school Clubs with an environmental activity. 57% of environmental clubs members said they got skills that they would use later in life, while 26% said they benefitted from taking visits and excursions. Another 26% said the clubs gave them an opportunity to take part in environmental conservation, while 25% said they got an opportunity to appreciate nature, and 22% an opportunity to teach and educate the community they lived in as shown in Table 2 below. All these attributes gained by students help to nudge students towards pro-environmental attitudes and behaviors.

The main reasons for students' not joining environmental clubs was due to some environmental clubs being inactive, their being non-compulsory and the students' being too heavily engaged in academic activities, leaving little free time for engagement in other activities (Table 3).

The main attributes associated with different clubs according to students and teachers are as shown in Table 4 below. The attributes show that the clubs boost the students' pro-environmental behaviors while at the same time improving the schools' and community's environmental management and conservation by providing practical and positive experience.

The day-to-day involvement of students in these activities reinforces positive environmental attitudes and leads to pro-environmental behaviors. The reinforcement is important as it make the activities a way of life. Additionally, the indirect link between peace and environment which, though not explicit, is important to nudge students towards environmental management as most conflicts are tied to competition over natural resources.

Table 4. Benefits of Scouting in Murang'a County Schools Sampled

Clubs and Societies	Benefits Cited by School Administration	Benefits Cited by Students
Scouts	•Ability to undertake group activities and team work successfully •Cohesion and cooperation among students – cammaderie among scouts good •Students are a source of inspiration to others in terms of discipline •Scouts recite school Mission when raising flag – they thus remind others of the core values of the school •The clubs instill discipline which is seen in the academic performance of the students •Scouting is about leadership and thus they learn leadership and life skills •They learn by doing and thus this becomes part of them •They become patriotic •Learn to do things by themselves •Undertake critical thinking e.g. making beds using ropes (not nails) •Learn survival skills •Gain self-esteem and leadership skills •Peer to peer teaching •Environmental management and consciousness •Love and nurture for the environment	•Get skills needed for conserving the environment •Get skills in first aid •Contribute to school's aesthesticity •Gain visibility among students •Gain leadership skills •Get more responsible e.g. taking responsibility of planting and tending of trees and flowers by watering and weeding •Get used to undertaking group activities and grow life long bonds •Scout get courage •Become creative especially during competitions when in camps with different schools •Learning to save and take care of the environment •Learn to manage time •Interact with different persons
Young Farmers and 4 K Clubs	•They are able to have practical and experiential knowledge where they put into practice what they have learnt in theory •They acquire leadership skills •Learn responsibility which they transfer at home •Members have embraced the concept of farming as a business which is not common, e.g. some students who were members of 4K club are self-employed engaging in agricultural activities like growing vegetables and establishing tree nurseries. •Some of the skills gained are transferred to their households and parents and others are able to learn the same	•Students gain monies for the club from agricultural activities which they then sue for some activities like attending the Nairobi International Fair •Get skills needed for conserving the environment •Gain leadership skills •Interact with different persons
Red cross Clubs	•They get an appreciation of nature •Get responsible by reaching out to needy members in the larger community •Able to deal with health emergency cases – first aid •Gain from socialization with different persons, even outside the school •Also trained in fire fighting •"What they learn is for life"	•Learn first aid skills •Learn life skills they can use in future •Improve the school and town environment through participation in cleaning and tree planting activities •Gain life-saving skills and personal protection
Environmental Clubs	•Cleanliness in the schools – little littering observed; school beautification; •Improved sanitation – through eco-toilets •Leadership qualities for example, ability to undertake public speaking.	•Association with school beauty and cleanliness; •Inspired to conserve environment; •Learn from educational trips; Cleanliness and smartness
Peace Clubs	•Peace corners where they plant trees •Students assist needy cases •Create peace links with communities by engaging in beneficial community activities e.g. cleaning of the local hospital and shopping centres;	•Students being able to interact with others; •Students get disciplined – no speaking in vernacular; •Students integration – no conflicts.
Business Clubs	•Environmental management by providing litter bins for the school - also empty •Students develop character after sometime; •Students become more responsible – do not wait to be told to do something;	•Hard work and commitment; •Esteem of knowing 'I belong'
Science Clubs	•Gain by being confident and being able to express themselves in public	•Getting a competitive spirit

Source: Field data, 2020

Table 5. Challenges of Implementing Environmental Programmes in Murang'a County Schools

School Club	Challenges
Scouts	•Funding for activities like camping •Very few can afford uniforms and registration to the Scouts body – necessary to participate in local and regional scouting activities •Some schools are not affiliated to the regional body – lack of registration •Not enough exposure and linkages •Water scarcity to maintain the flowers •Lack of confidence among individual students
Young Farmers	•Agriculture is compulsory in Forms 1 and 2. It is not very attractive to students due to the manual activities. •Students can also be lazy and need prompting •Lack of sufficient time to engage in all activities planned
Environmental Clubs	•Livestock from school and goats from the neighborhood destroy planted seedlings •Lack of space to plant trees •Form 4s not allowed to engage in club activities and also not to go out of school •Lack of resources •Girl child sensitive to manual work – they look at it as degrading •Students have to take care of contributions for non-academic activities •Insufficient resources – some students left behind due to lack of resources •Patrons as volunteers
Peace clubs	•Finance and resources;
Business club	•No water points in farm or around school •Inability to account for funds from the canteen

Source: Field data, 2020

Challenges to the Successful Implementation of Environmental Programmes in Schools

The key challenges encountered by students in their quest to undertake environmental conservation in schools included: Lack of resources (24%); lack of support and appreciation (18%); lack of motivation (17%); lack of time (12%); and discouragement by other students (7%).

From the clubs and school administration perspective, the main challenges were: Time is never enough; students also have to be reminded to actualize what they might have planned for; finances – not enough resources to undertake planned activities; lack of committed and trained teachers to run the clubs – teachers not trained for club's management and it's all a matter of interest.

At the individual Club level, the challenges in Table 5 were experienced. Key among the challenges was the preparedness of teachers heading the environmental programmes as patrons. Most of them are volunteers without any skills per se to run the clubs. When they change or the school administration changes, often a new club policy is implemented, making consistency in clubs a challenge. According to Cheng and So (2015), teachers' environmental literacy and beliefs, and how environmental education is conducted are important variables affecting how students learn about environmental issues. However, teachers are not sufficiently prepared to teach about environmental issues, and most of the experiential programmes rely on individual teacher's interests and initiative to run.

The other challenge is that environmental education programmes are viewed as an extra-curricular activity by both the students and the school management (Innovation for Education Fund, 2010). Due to this, the school management allocates little time to these environmental programmes that they consider as extra-curricular activities and not an education priority. Due to lack of support from the school management, the students also rarely take environmental conservation activities seriously. At the same time, there is lack of broader policy support with the overall outcome is that environmental programmes end up being short term and are rarely sustainable.

To make the environmental clubs better, the students suggested several measures such as: Allocating more time to clubs to make them more active (12.5%); allocating more resources (27.3%); making them compulsory (16.9%); making them examinable (6.9%); making them more practical (51.4%); leaving them as they are (2.2%); and making them more active (0.8%).

Influence of Experiential Education Programmes on Conservation in Murang'a County

The study investigated whether students' engagement in school experiential environmental programmes, which provide direct learning, action, and conservation experiences in environmental protection among secondary school students, impacts on instilling positive environmental attitudes, and positive environmental behavior in selected secondary schools in Murang'a County. The comparison was eventually to assess pro-

Table 6: t-tests results on various environmental conservation attributes

	Environmental Attribute	95% Confidence Interval of the Difference		Difference of means	P- value
		Lower	Upper		
1.	Solid Wastes Management	0.009	0.644	0.327	0.044*
2.	Water Resources Management	-0.021	0.295	0.137	0.089
3.	Hygiene	-0.029	0.166	0.068	0.170
4.	Energy and Climate Change	0.034	0.519	0.276	0.026*
5.	Natural Resources Management	0.350	1.125	0.737	0.000*
6.	Environmental Concerns	0.0184	0.4686	0.2435	0.034*
7.	Overall Environmental influence	0.8734	2.7050	1.7892	0.000*

Source: Field data, 2020 (NB: *($p<0.05$), ** ($p<0.01$))

environmental behavior which is an indicator of environmental education success (Hidayah, 2017).

The "t-test of independent groups" was used with results shown in Table 6 below. It showed that there was a significant difference in behavior on solid wastes management between members of environmental clubs and non-members among students in Murang'a county. The null hypothesis was rejected due to the significance level of p at 0.044 ($p<0.005$). The difference in pro-environmental behavior can be attributed to the fact that most of the environmental Clubs in the schools are engaged in aspects of cleanliness, including provision and emptying of bins. The students are also involved in improving the aesthetics of the schools by planting flowers and trees and maintaining them. The Clubs thus seem to have reinforced the student's pro-environmental behaviors with regards to solid wastes management. The first-hand experience in cleanliness is an important influencing factor to getting students interested in nature, and positively influences students' beliefs towards their natural environment and eventually leads to pro-conservation behavior (Sharma, 2016).

There was no difference in behavior on water resources management between current members of environmental clubs and non-members in Murang'a County. The p value was 0.089 ($p >0.005$). The lack of significance might be due to the fact that the current activities of the School Clubs might not have a direct relation to water resources management strategies. It also affirms that behaving well with regards to one aspect of environmental management does not mean that one will also exhibit pro-environmental behavior in another field.

There was also no difference in behavior in hygiene between members of environmental clubs and non-members in Murang'a County. The p-value was 0.170 ($p>0.005$). This is because the behavior on hygiene is mainly affected by external factors such as distance to taps and lack of soap in schools.

However, there was a significant difference in behavior in the area of energy and climate change between members of environmental clubs and non-members in Murang'a county. The p value was 0.026 ($p < 0.005$). Most of the issues associated with pro-environmental energy and climate change understanding and behavior have to do with responsibility and leadership qualities which are among the key attributes that school administrations tie to being in the various environmental clubs. The skills learnt in the clubs are thus expressed by the responsible behavior of the students in their pro-environmental actions.

There was also a significant difference in behavior on natural resources management between members of environmental clubs and non-members in Murang'a county. The p-value was 0.000 ($p<0.001$). This means that students participating in environmental clubs are significantly more active in natural resources management that those who do not participate. This is because Clubs allow students to engage in group activities, which reinforce care and nurture of the environment, leading to positive individual behaviour among the students. The students' participation in natural resources management by the students in Murang'a county was impressive. With an average 10 trees planted per student, and at least 50% survival on average, this translates to about 5 surviving trees per student. With about 100,000 secondary school students, Murang'a County students are able to plant and grow about half a million trees in a year, which is about 1% of the 500 million trees, the country plans to plant (note, not grow) this year as it tries to meet the 10% tree cover in the country. This means that the country can actually target secondary students to grow about 30% of the planned annual tree growing, and if it goes down to primary schools, assuming the same tree growing potential, the whole target would actually be met by the students. Some of the students also took tree planting through groups. 41% of the students participated in communal tree planting through community youth groups; 17% through environmental clubs; 13% via Scouts and Red Cross (13%); 10% using Church groups (10%) and 8% Young farmers while 6% and 5% participated in School groups and as Family respectively.

There was also significant difference in behavior in environmental concerns between members of environmental clubs and non-members in Murang'a county. The p-value was0.034 ($p<0.005$). This shows that it is the environmental attitudes and individual's sense of responsibility towards the environment that really shape environmentally friendly behavior (Chen, 2011).

When all the different attributes are combined, the p value was 0.000 ($p<0,001$) meaning there was a significant

difference in environmental knowledge, attitudes and behavior between members of environmental clubs and non-members in Murang'a county. This shows that the clubs, through their experiential learning expose students to an active process of learning, where there is interaction between the learner and the environment, making leaning enjoyable (Anderson et al., 2015). The hands-on approach leads to heightened awareness and ultimately action (Chawla, 2015). The ultimate aim of education is to change human behavior (Harold, 2015) which is key to tackling and preventing environmental degradation. It can also be concluded that it is difficult to teach the values of conservation and preservation to persons who do not appreciate the natural world around them or who are afraid or loathe to venture into it (Chawla, 2015).

CONCLUSION AND RECOMMENDATIONS

Conclusion

The findings have found that environmental programmes actually improve student's pro-environmental behavior and thus contribute to environmental literacy. The effectiveness of the clubs in promoting environmental literacy is due to the experiential learning methods where students learn by engaging in environmental activities which in turn transform their knowledge into action as regards environmental conservation. The programmes are also credited with imparting leadership skills to students. The main challenges experience in the running of the clubs is lack of a policy and institutional framework with subsequent lack of funding and support. The programmes are also considered as extracurricular activities and not an education priority.

Recommendations

For future environmental sustainability, it is especially important to target the youth and school-going children who will be the leaders of tomorrow in environmental education initiatives. As such, the programmes, having been seen to work should be fully supported mainly through policy an institutional framework that will enhance their implementation. The experiential environmental clubs should also be given more resources through schools. This will enable them implement practical programmes that connect students with nature and make them more responsible for nurturing for it. More resources will mean more activities, more trips, and ability to invite professionals to give technical input to some of the programmes. It will also help inculcate environmental behaviour and demystify environmental conservation issues. Teachers' capacity should be built through on-going training and environmental education also initiated in the teacher training programmes. This will enable teachers come up with innovative environmental activities that increase students' environmental literacy.

Conflict of interests

The authors declare that there is no conflict of interests regarding the publication of this manuscript.

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