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Perceptions of Secondary School Students towards Natural Resources Management: Case Study of Participants in FoF and Non-Participants

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Abstract

Integrating natural resources management in the secondary school curriculum in Kenya has received a lot of talk without adequate practical activities. The Farmers of the Future Programme under the World Agroforestry Centre, formally the International Centre for Research in Agroforestry (ICRAF), initiated a practical approach to integration of natural resources management in the secondary school curriculum in Kenya. This paper provides information on significant findings of a study that was carried out to determine the potential of FoF in integrating natural resources management into the secondary school curriculum in Kenya. A comparison between secondary school students who are involved in FoF programme and those not involved was done to determine their perceptions towards natural resources management. Further, comparison of perceptions by gender among learners who are involved in the FoF initiative was done. The study employed an ex-post-facto design in data collection using questionnaires. Questionnaires were analysed using t-test at $\alpha = 0.05$. The findings indicated that the FoF programme had a significant influence on learners' perceptions towards natural resources management. It was therefore concluded that FoF programme enhanced positive perceptions towards natural resources management among learners. On the basis of the findings, it was recommended that the FoF programme be expanded to cover more schools.

Keywords:
*Agricultural education,
Agroforestry, Natural
resources, Perceptions.*

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INTRODUCTION

The Farmers of the Future (FoF) Programme is a recent initiative that was conceptualised in 2000 by the World Agroforestry Centre. The aim was to facilitate and contribute to integration of agroforestry and natural resources management into the school curriculum, mainly in the basic education (Vandenbosch *et al.*, 2002). Programme under the World Agroforestry Centre, formally the International Centre for Research in Agroforestry (ICRAF), initiated a practical approach to integration of natural resources management in the secondary school curriculum in Kenya (Vandenbosch *et al.*, 2002). This paper provides information on significant findings of a study that was carried out to determine the potential of FoF in integrating natural resources management into the secondary school curriculum in Kenya (Kanyi, 2007).

Many agricultural programmes have been practiced in Kenyan schools for a long time with the aim of developing technical skills in learners as well as teachers (Moir, Vandenbosch, Scull and Carvalho, 2007). Educators need to develop abilities necessary in empowering learners in vocational education such as agriculture (United States Office of Education, 1976). In some developed countries such as the United States of America, agricultural institutions have taken charge of providing leadership and human resource development among the learners of agriculture even at post-secondary level (Foster & Dodge, 1991). Empowered human resource has a great potential to manage natural resources more sustainably. School curriculum should empower human resource with the vocational skills to manage natural resources in sustainable manner (Phipps, Osborne, Dyer and Ball (2007).

During the 1990s, International Centre for Research in Agroforestry (ICRAF) evolved into the World Agroforestry Centre with a vision that by the year 2010, 80 million peasant farmers would get access to agroforestry research innovations that will improve their livelihoods and help to sustain the global environment, Maundu and Tengnas (2005). Many development and research organisations are now using schools to create awareness and positive perceptions towards

sustainable agriculture. Innovative education is now seen as a crucial aspect of rural development, food security and wealth creation (Vandenbosch *et al.*, 2002).

Despite its effort in education for sustainable agriculture, the potentials of FoF programme in influencing learners' perceptions towards natural resource management are not well understood. Literature concerning potentials of FoF initiative in Kenya secondary schools has not been documented adequately. There was therefore a need to study the FoF programme in Kenya secondary schools and document empirical data on the programme's potentials in influencing learners' perceptions towards natural resources management for sustainable development. This paper explores the effects of the Farmers of the Future (FoF) programme on learners' perceptions towards natural resources management in selected secondary schools in western region of Kenya hence ascertaining the contribution and potentials of the FoF programme in advancing sustainable development in Kenya. Collaborating schools and the farmers forms a strong bond for agroforestry and natural resources management at farm level (Noordin, Niang, Jama, & Nyasimi, 2001). Sustainable agriculture and natural resources management cannot be achieved without adopting a more holistic approach to land management. African educators have realized that they have a major role to play in bringing about better integration and coordination of land use education (Temu, Rudebjer, & Zulberti, 1996). Parties involved in this systematic joint learning process can benefit from the synergy generated which is superior to individualized working.

Lopokoiyit (1995) observed that perceptions of learners towards agriculture are enhanced by an appropriate curriculum. Perceptions of natural resources management among learners as a result of participation in FoF activities can be measured in terms of scores that learners obtain in validated instruments (Makau, 1997). It is therefore imperative to utilise locally available resources to inculcate positive perceptions among school going pupils. World Agroforestry Centre through FoF is enhancing positive perceptions towards natural resources management among

learners particularly in primary schools by using approaches that entertaining for instance, drama, with the theme of environmental sustainability.

PURPOSE AND OBJECTIVES

The purpose of the study was to investigate the effects of the FoF programme on learners' perceptions towards natural resources management. The study sought to investigate the activities of FoF programme and also determine if there is any difference in perceptions towards natural resources management by gender among the learners who are exposed to the FoF programme in Kenya secondary schools.

The specific objectives of the study were:

Describe and compare the secondary school learners' perceptions towards natural resources management between those exposed to FoF activities and those not exposed.

Describe and compare differences in perceptions towards natural resources management by gender among secondary school learners' who are exposed to Farmers of the Future programme.

MATERIALS AND METHODS

The purpose of the study was to investigate effects of the Farmers of the Future (FoF) programme on secondary school learners' perceptions towards natural resource management. The study also sought to investigate the activities of FoF programme and determine if there is any difference in perceptions towards natural resources management by gender among the learners who are exposed to the FoF programme in Kenya secondary schools.

This study employed an ex-post facto design. In the study, learners' perceptions towards management of natural resources as a result of exposure to Farmers of the Future programme were studied. Adoption of ex-post facto design in the study was supported by the fact that the researcher was seeking to determine possible antecedents of events that had happened and was not in a position to manipulate them. These events were the FoF activities and the effects that they had already caused on the learners' perceptions towards natural resources management. The target population of the study was

secondary school learners who are members of environment club, agroforestry club, wildlife club, some of whom are involved in FoF programme while others are not.

Reliability of the instrument was tested through pilot testing where thirty secondary school learners were involved. Cronbach's alpha was used to determine the reliability of items. Reliability coefficient of 0.722 was realised. This was above the reliability coefficient of 0.70 thresholds as recommended by Koul (1993). Six secondary schools were randomly selected for inclusion in the study; three were involved in FoF programme while the other three were obtained from schools that are not involved in the FoF programme. 20 pupils were randomly selected from each participating school. The sample was composed of 120 respondents.

Data were collected using a questionnaire. The statements related to natural resources management which secondary school learners responded to were scored on a five point Likert scale. The legend were strongly disagree (SD), disagree (D), Undecided (U), agree (A), and strongly agree (SA). Sorting out of the positive and negative items in the questionnaire was done manually before coding of the data for analysis. Some items in the questionnaire were stated positively while others negatively. This was done to minimise chances of pattern answering of the items by some respondents. In the scoring of the negatively stated items therefore "SD" carried a maximum of 5 points, "D" 4 points, "U" 3 points, "A" 2 points and "SA" 1 point. SD in this case indicated very positive perceptions while SA indicated very negative perceptions towards natural resources management.

The Statistical Package for Social Science (SPSS) was used for data analyses. The hypotheses were analysed using t-test at $\alpha = 0.05$.

RESULTS

Objective one of the study was to describe and compare the perceptions of secondary school students towards natural resources management between those involved in FoF activities and those not involved. The data for this objective were gathered from secondary school students

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Table 1: Comparison of perceptions of secondary school students towards natural resources management between those involved in FoF and those not involved by mean and standard deviation per statement

Statements related to natural resources management which secondary school students responded to.	Participation in FoF	Mean	Std. Deviation
1. Enhance Inorganic fertilizers in farming	Non participants	3.38	1.39
	Participants	3.16	1.52
2. Herbicides should be banned in weed control	Non participants	2.47	1.28
	Participants	2.53	1.29
3. Education is powerful against poverty	Non participants	4.34	1.16
	Participants	4.39	0.95
4. Present education curriculum in Kenya has minimal focus on skills for life and sustainable development	Non participants	2.66	1.25
	Participants	3.32	1.32
5. Participation of the underprivileged and marginalized is enhanced in present curriculum	Non participants	3.67	1.12
	Participants	3.66	1.19
6. Prefer learning by doing in agriculture	Non participants	4.05	1.29
	Participants	4.47	0.89
7. Involving students and teachers in community work should be discouraged	Non participants	4.72	0.85
	Participants	4.84	0.37
8. Community members be involved in club activities	Non participants	4.40	0.94
	Participants	4.68	0.62
10. Much time is wasted on subjects like geography and agriculture	Non participants	4.64	0.69
	Participants	4.71	0.57
11. Soil erosion can be controlled effectively by planting more trees	Non participants	4.53	0.68
	Participants	4.61	0.50
12. Environmental conservation as a main subject should be introduced in schools	Non participants	4.03	0.95
	Participants	4.34	0.78
13. Discourage farmers from cultivating on the river valley	Non participants	3.58	1.44
	Participants	3.82	1.61
14. Debate on pollution is a waste of time	Non participants	4.16	1.15
	Participants	4.71	0.73
15. More comfortable with English and Kiswahili teachers than biology, agriculture and geography teachers	Non participants	4.12	0.99
	Participants	4.63	0.71
16. Cleaning cloths in the river should NOT be discouraged because it saves time	Non participants	4.53	0.80
	Participants	4.68	0.62
17. Find it difficult to plant and care for tree seedlings	Non participants	4.16	1.04
	Participants	3.97	1.13
18. Agriculture is not interesting	Non participants	4.68	0.69
	Participants	4.87	0.53
19. Some large forests in Kenya should be cleared to settle the landless people	Non participants	4.25	1.11
	Participants	4.55	0.76
20 Agriculture practical in schools should be stopped	Non participants	4.55	0.78
	Participants	4.87	0.34
21. Would like a career that does not require any farming activity	Non participants	4.07	1.18
	Participants	4.39	0.89
22. Likely to become a successful environmental conservationist	Non participants	4.46	0.83
	Participants	4.68	0.53

(n=109)

using a questionnaire. Some statements were negatively stated while others were positively stated so as to avoid pattern response from certain respondents.

Students who were exposed to FoF programme had better mean scores in individual items in the questionnaire than those not exposed except in items number 1, 5, and 17. In these three items however, the difference in mean of individual items in the two groups was quite low. Students exposed to FoF had interestingly high mean score in individual items for instance in items number 4 and 14 with means of 3.32 and 4.71 respectively against 2.66 and 4.16 respectively of those who were not exposed to FoF programme.

The positive perceptions towards natural resources management among students exposed to the FoF programme is indicated by the high mean scores in individual items. It can therefore be concluded that FoF programme had a significant contribution in learners' positive perceptions towards natural resources management among secondary school students.

Table 2 shows the overall perceptions index of secondary school students exposed to FoF programme and those not exposed in their perceptions towards natural resources management. From the table, the overall mean of students that are involved (exposed) in FoF programme was higher than that of those not participating in FoF programme. The overall mean of students participating in FoF was 4.3194 against 4.0593 of the non-participating and standard deviations of 0.4459 and 0.3409 respectively. Learners who were involved in FoF indicated positive perceptions towards natural resources management than those who were not involved. FoF programme enhances application of theory into

Table 2: Perceptions index towards natural resources management of secondary school students exposed to FoF programme and those not exposed

Exposure to FoF	Overall mean	Overall SD
Not exposed	4.0593	0.3409
Exposed	4.3194	0.4459

(n=109)

practical situations among learners in their farming environment. The findings of the research therefore indicated that the FoF programme has potential of enhancing sustainable agriculture among the young people who are the future farmers.

T-test was applied to determine whether there was a significant difference in perceptions towards natural resources management between secondary school learners exposed to the Farmers of the Future programme (FoF) and those not exposed. The results of the analysis are provided in table 3. The results from Table 3 indicate that the perceptions difference between secondary school students involved in FoF programme and those not involved is statistically significant. From the table, the P-value of 0.002 which indicates the level of significance is less than the fixed alpha level of 0.05. This indicates that there was a statistical significant difference between secondary school learners exposed to the Farmers of the Future programme (FoF) and those not exposed, with those exposed indicating better perceptions towards natural resources management.

This could be explained by the fact that students exposed to FoF programme have attained some information on natural resources management over those not exposed hence scored better in the rating scale. FoF programme puts emphasis on learning by doing and thus enhances psychomotor skills in the teaching learning process. The learners are involved in practical activities such as planting trees, planting cover crops, soil conservation, planting vegetables, livestock keeping and tree nursery management. ***Perceptions towards Natural Resources Management by Gender among Secondary School Students exposed to the Farmers of the Future Programme***

Objective two of the study aimed at describing and comparing perceptions of secondary school students towards natural resources management by gender. The respondents were the students involved in FoF programmes and comparison was according to gender of the student. The findings of the study indicated that there was no gender difference in perceptions towards

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Table 3: T-test on perceptions towards natural resources management of secondary school students involved (participate) in FoF and those not exposed

Participation in FoF	N	Mean	Std. Dev.	t-value	df	P-value
Not involved	58	4.0593	0.3409	3.231	94	0.002
Involved	51	4.3194	0.4459			

Significant at the 0.05 level

natural resources management among secondary school students involved in FoF programme. This could be attributed to the fact that the approach taken by FoF appeals to both boys and girls hence similar level of performance in secondary school learners perceptions towards natural resources management.

Results of this objective are tabulated in Table 4. The overall mean of boys was 4.4227 while that of girls was 4.2825. This variation was however insignificant in this study. Maccoby and Jacklin (1974) while studying the attitudinal and value differences between sexes noted that girls have different interests, express different attitudes, and hold different values with regard to learning what is important to them. The findings of this study indicated that FoF programme added a new dimension to learning that was favourable to both boys and girls. This is indicated by their close mean as indicated in Table 4.

This may be attributed to the fact that FoF programme engages different methods in the teaching and learning process on environmental management matters. These teaching learning methods include drama, debates, discussion, excursion and practical work. These approaches appeal to both boys and girls and thus all are motivated thus resulting to similar perceptions towards natural resources management as indicated in this study.

This study investigated whether there was statistical significant difference in perceptions towards natural resources management by gender among secondary school students who are exposed to the Farmers of the Future programme. Studies have been done to investigate and explain abilities and achievements of learners by gender (Mutonga, 1995). Maturation differences have been found to be some of the causes of sex differences in abilities (Lyung, 1965). Lyung further found that girls had accelerated physical development at puberty stage, which could otherwise affect their perceptions. This study therefore investigated whether there were significant gender differences in perceptions towards natural resources management among secondary school students who have been exposed to FoF programme.

Results of this study revealed that the perceptions means from the rating scale, between boys and girls did not differ significantly, with boys scoring 4.4227 while girls scored a mean of 4.2825. The findings of the study could be explained by the fact that FoF initiative is involved in instructional methods that are equally preferred by both girls and boys. The findings of this study concurs with those of Walton (1986) who suggested that the fact that males and females are biologically and genetically different does not necessarily make males better learners in the world of science. And to suggest any innate differences is to promote gender stereotypes.

Table 4: T-test on perceptions towards natural resources management by gender among secondary school students exposed (participants) to FoF programme

Gender	N	Mean	Std. Dev.	t-value	df	P-value
Male	29	4.4227	0.7048	0.851	49	0.401
Female	22	4.2825	0.3186			

Significant at the 0.05 level

From Table 4, the P-value was 0.401. The value is greater than the fixed alpha value of .05. This implies that the boys and girls did not differ significantly in their perceptions towards natural resources management. This may be attributed by the fact that involvement of boys and girls in the Farmers of the Future programme does not give any apparent advantage to either group of learners along the gender divide.

The perceptions of secondary school learners towards natural resources management varied significantly depending on whether they are involved in FoF programme or not. Those involved indicated better perceptions than those not involved. This could be attributed to the fact that FoF programme empowers learners with real life skills in agroforestry and natural resources management.

Comparison of boys and girls who are involved in FoF programme was made to ascertain whether there was a statistical significant difference in their perceptions. The study found no significant difference in perceptions towards natural resources management between boys and girls that are involved in FoF programme in Kenya secondary schools. This may be attributed to the fact that FoF initiative ensures that there is no gender bias in its activities.

RECOMMENDATIONS

Based on the findings of the study, the researcher made the following recommendations that policy makers in education and environmental matters as well as curriculum developers may find important. Teachers being the implementers of school curriculum may also benefit from the recommendations given.

- The FoF programme should be expanded to cover more schools. The expansion of the programme to cover more schools is supported by the fact that the learners involved in the programme in secondary schools indicated better perceptions towards natural resources management than those who are not in the FoF programme. This indicates that the learners in the FoF programme are more likely to manage natural resources in agriculture better than those not involved in the programme in the future.

- The FoF training approaches should be maintained. Since the learners in secondary schools that are involved in FoF programme indicated similar level of perceptions towards natural resources management, FoF should maintain the same approaches that is using in integrating natural resources management into the schools' curricula. The approaches are not gender biased according to the findings got in this study. This was indicated by the lack of statistical significant difference between boys and girls involved in FoF programme in their perceptions towards natural resources management.

- Comparative study should be carried out in a country where FoF programme has been going on for a long period of time. The findings of such a study would give opportunity to compare the programme under different education systems.

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