EFFECTS OF THE FARMERS OF THE FUTURE PROGRAMME ON LEARNERS' PERCEPTIONS TOWARDS NATURAL RESOURCES MANAGEMENT IN SELECTED SCHOOLS IN WESTERN REGION OF KENYA

By

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DECLARATION AND APPROVAL

Declaration

I hereby declare that this thesis is my original work and that it has not been presented for an award of a diploma or degree in this or any other University.

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Approval

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DEDICATION

This thesis is dedicated to my parents Joseph Kanyi Wambage and Elizabeth Wanjiru Kanyi.

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ABSTRACT

World Agroforestry Centre, formerly ICRAF, internally conceptualised the Farmers of the Future initiative in the year 2000. The aim was to facilitate and contribute to the integration of natural resources management in the school curriculum. Literature about the activities and the impact of the FoF initiative in Kenya had not yet been documented adequately. This study sought to determine the effects of FoF programme on primary and secondary school learners' perceptions towards natural resources management and also document empirical information on the activities of FoF in Kenya. The study employed an ex-post-facto design. The location of the study was four districts in western region of Kenya, namely; Siaya, Bondo, and Kisumu in Nyanza province and Vihiga in Western province. The target population of the study was primary school pupils in classes 6, 7 and 8 and secondary school students in forms 1, 2, 3 and 4 who are members of environment club, agroforestry club, young farmers club, wildlife club, 4-K club and patrons of these clubs. Six secondary schools and six primary schools were involved in the study. The sample was composed of 240 learners and 12 teachers, making a total of 252 respondents. The data were collected using five sets of instruments; a questionnaire for primary school pupils, a questionnaire for secondary school students, an interview schedule for primary school teachers and an interview schedule for secondary school teachers and an observation schedule. The observation schedule and the teachers' interview schedules were used to obtain corroborative information on learners' membership to FoF programme and the related activities of FoF in the respective schools. Data 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 with those involved in the programme indicating more positive perceptions than those who were not involved in the programme. It was therefore concluded that FoF programme led to positive perceptions towards natural resources management among learners. Comparison of learners who are involved in FoF initiative indicated no statistically significant gender difference in their perceptions towards natural resources management. Recommendations from the study are that the activities of FoF in both primary and secondary schools should be expanded to cover more schools and the approach adopted by FoF in integrating natural resources management in the school curriculum should be maintained.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS AND ABBREVIATIONS

AF:	Agroforestry
AFRENA:	Agroforestry Research Networks for Africa
AFSA:	Agroforestry Southern African Project
ANAFE:	African Network for Agroforestry Education
FoF:	Farmers of the Future
ICRAF:	International Centre for Research in Agroforestry
ITK:	Indigenous Technical Knowledge
KEFRI:	Kenya Forestry Research Institute
NARS:	National Agriculture Research Systems
NASCO:	National Agroforestry Steering Committees
NGOs:	Non-Governmental Organizations
Sida:	Swedish International Development Corporation Agency
UNCED:	United Nations Conference on Environment and Development

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Food security and education are inter-linked and can contribute to the process of enabling rural people to reduce poverty through proper utilization of locally available resources of soil, water, trees and animals. The World Agroforestry Centre, formerly International Centre for Research in Agroforestry (ICRAF), conceptualised the Farmers of the Future (FoF) initiative in the year 2000 in order to facilitate and contribute to integration of agroforestry and natural resources management into the school curriculum, mainly in basic education. Basic education is now seen as a crucial aspect of rural development, food security and wealth creation (Vandenbosch, Taylor, Beniest, & Tesemma, 2002).

The youth need to be exposed to basic education that offers real life survival techniques in the rural areas such as practical agroforestry. Agroforestry comprises several deliberate land use systems where trees, crop plants and animals interact in the same piece of land for improved agricultural output (Young, 1986). This forms one of the working principles of the FoF programme. Many development and research organisations are now using schools to create awareness and positive perceptions towards sustainable agriculture. It is on this premise that the World Agroforestry Centre initiated the Farmers of the Future programme in Western region of Kenya to enhance natural resources management among school going learners who are actually the future farmers.

World Agroforestry Centre and its affiliated partners are working with 29 schools in the region, mainly primary schools from class four upwards. However, colleges, polytechnics and universities are also involved in seminars. It is thought that Farmers of the Future programme has tremendous potential to contribute to the goal of the commitments made during the world summits in Rome in 1996 and in Jomtien, Thailand in 1990, that is; "Food for All" and "Education for All" respectively, as well as to the national poverty reduction strategies in Kenya (Food and Agriculture Organization, 2002). Within this

framework, there are some real crosscutting issues in agriculture like enhancement of positive perceptions to which Farmers of the Future programme can contribute to the youth.

Agenda 21 of the United Nations Conference on Environment and Development (UNCED), Rio de Janeiro in 1992, addressed the issue of under nutrition, the apparent incapacity of agriculture to meet future food needs, and the gradual degradation of natural resources. The Farmers of the Future programme intends to empower the youth with knowledge and attitudes which are important to avert the mentioned problems (Vandenbosch et al., 2002). Farmers of the Future initiative also echoes the resolutions reached by World Food Summit held in Rome in 2002 which recognized the urgent need to reinforce the efforts against hunger and the acute threat of the HIV/AIDS pandemic and its devastating impact on food security (FAO, 2002).

The study was conducted in the western region of Kenya in, Siaya, Bondo, and Kisumu in Nyanza province and Vihiga in Western province. Respondents were learners drawn from primary schools in classes 6, 7 and 8 and secondary school in forms 1, 2, 3 and 4 who are members of environment club, agroforestry club, young farmers club, wildlife club, 4-K club. Patrons of these clubs were also involved. The FoF programme engages such existing clubs in schools.

The FoF programme also uses notice boards to pin articles. Farmers of the Future initiative use several methods during the teaching and learning process. Common methods include essay writing, debates and drama. They all have a common theme of environmental management for sustainable development. The use of agricultural plots in schools to demonstrate tree nursery management is a common activity among learners.

Activities similar to those of Farmers of the Future are evident in, Philippines, Panama, India, Cuba, Vietnam, Zambia, Tanzania, Mali and South Africa. Farmers of the Future initiative is involved in capacity building of learners and the teachers in agroforestry and sustainable agriculture as well as linking research and development organisations with the rural communities. So far, the FoF programme has organised several workshops in

Kenya. Both primary and secondary school teachers are involved, together with other stakeholders in agriculture.

FoF programme is engaged in multi-approach in its integration of natural resources management into the school curriculum. These include drama, poems, and hands-on activities among others. Use of several instructional approaches contributes significantly to the learners' perceptions toward natural resources management and agriculture in general. Instructional approaches that require application of psychomotor skills are particularly important in enhancing learners' perceptions towards agriculture (Kibett, 2002). The natural resources that were considered in this study were soils, trees and water. Learners' perceptions, such as those towards 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).

1.2 Statement of the Problem

The gradual degradation of the environment requires multidisciplinary control approach (FAO, 2002). It was on this premise that the World Agroforestry Centre (formerly ICRAF), through the Farmers of the Future (FoF) programme adopted a school-based programme to enhance learners' positive perceptions towards sustainable agriculture. FoF initiative is an international programme. The initiative is however, quite recent in Kenya. It was initiated in the year 2000. A working network strategy was put in place two years later.

Despite its effort in education for sustainable agriculture, the activities of FoF programme and their effect on learners' perceptions towards natural resource management are not well understood. Literature concerning practical activities of FoF programme in Kenya, the potentials, and the problems encountered in the implementation of FoF activities has not been documented adequately. Lack of such vital information could limit diffusion and adoption of similar activities in more schools other than those where the programme was initially started. There was therefore, a need to study the FoF programme in Kenyan primary and secondary schools and document empirical data on the programme's activities on the site and the related effects on the learners' perceptions towards natural resources management.

This study therefore, sought to determine and document the effects of Farmers of the Future (FoF) programme on learners' perceptions towards natural resources management and also to document empirical data on the activities of FoF programme in enhancing integration of natural resources management into the school curriculum

1.3 Purpose of the Study

The purpose of the study was to investigate effects of the Farmers of the Future programme on primary school and secondary school learners' perceptions towards natural resource 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 primary schools and secondary schools.

1.4 Objectives of the Study

The specific objectives of the study were:-

i. to document the activities of the Farmers of the Future programme in Kenyan schools;

ii. to describe and compare the primary school pupils' perceptions towards natural resources management between those exposed to FoF activities and those not exposed;

iii. to describe and compare the secondary school students' perceptions towards natural resources management between those exposed to FoF activities and those not exposed;

iv. to describe and compare differences in perceptions towards natural resources management by gender among primary school pupils exposed to Farmers of the Future programme;

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

1.5 Hypotheses

The following null hypotheses were tested at 0.05 level of significance:-

H_{O1}: There is no significant difference in perceptions towards natural resources management between primary school pupils exposed to the Farmers of the Future programme and those not exposed.

H_{O2}: There is no significant difference in perceptions towards natural resources management between secondary school students exposed to the Farmers of the Future programme and those not exposed.

H_{O3}: There is no significant difference in perceptions towards natural resources management by gender among primary school pupils who are exposed to Farmers of the Future programme.

H_{04}: There is no significant difference in perceptions towards natural resources management by gender among secondary school students who are exposed to Farmers of the Future programme.

1.6 Significance of the Study

The study provided information on the effectiveness of the Farmers of the Future programme in western Kenya in integrating education for sustainable development in the school curriculum. It is believed that the World Agroforestry Centre will find the research findings helpful in determining the success, potentials and constraints of the Farmers of the Future programme in relation to the objectives of the programme. Curriculum developers in Kenya may also benefit from empirical and objective data of the study on how to prioritise natural resource management in the education curriculum. The findings of the study are particularly important to teachers in enhancing clubs' activities in perceptions and attitudinal change among learners. Other organisations that are involved in natural resources management in Kenya would also find the information useful.

1.7 Scope of the Study

The study was carried out in four districts, namely; Siaya, Bondo, and Kisumu in Nyanza province and Vihiga in Western province. Six secondary schools and six primary schools were involved in the study. Respondents were drawn from agriculture related clubs such as environment club, agroforestry club, young farmers club, wildlife club, 4-K club and their patrons. The study was confined to learners' perceptions towards natural resources management. The natural resources that were considered are trees and related vegetation, soil and water.

1.8 Limitations of the Study

The study was limited by funds and therefore, only six schools out of twenty nine that are in FoF programme were involved in the study. The wide distance between schools where the study was carried out and the residential area of the researcher was limiting. The researcher was therefore, unable to visit all schools involved in the FoF programme.

1.9 Assumption of the Study

It was assumed that the four districts involved in the study, Siaya, Bondo, Vihiga and Kisumu, were homogenous since the schools involved in the study followed similar education curriculum prepared by the Kenya Institute of Education. The schools are also located in areas with similar ecological conditions. Therefore, any difference in perceptions among the respondents was attributed to exposure or non-exposure to the activities of the Farmers of the Future programme.

1.10 Operational Definitions of Terms

Adoption: In this study, adoption meant the acceptance and continued application of the new practices of agroforestry and environmental management by learners as recommended by the Farmers of the Future programme.

Agroforestry: A collective term for land use systems in which non-food woody trees are deliberately grown on the same land with non-woody crops and/or kept together with animals either in a spatial arrangement or time sequence in which there are both ecological and economical interactions between the tree and non-tree components.

Exposure: Learners' contact with or experience in any information or activities that are initiated by the Farmers of the Future initiative in their school.

Farmers of the Future (FoF) Programme: In this study, the term meant an educational programme aimed at enhancing natural resources management for sustainable development among school going learners. The FoF programme was conceptualised and implemented by the World Agroforestry Centre, formerly the International Centre for Research in Agroforestry.

Gender: The socially determined personal and psychological characteristic associated with being male or female. In this study, gender meant boys and girls learners in primary and secondary schools.

Indigenous Technical Knowledge (ITK): In this study, the terms were used to refer to a body of knowledge built by a group of people through generations of living in close contact with nature; for instance identification and caring of medicinal trees by a local community.

Natural resources management: In the study, the term meant better or sustainable use of arable land, rivers, lakes, wild and domesticated animals, woody tree plants and crop plants to satisfy present human needs without reducing or endangering availability and utilisation of the same resources in the future. The main natural resources that were considered in this study were soil, water, crop plants and trees.

Perceptions: In this study, the term meant the extent to which a learner expresses his/her judgement, opinion or feelings towards natural resources management. The particular natural resources that were considered were soils, water shrubs and woody trees. The

level of expression of perceptions was determined through statistical analysis of learners' responses to the statements in the questionnaire.

Primary school pupils: In this study, the term meant learners in upper primary school; standard 6, 7 and 8. The study considered upper primary pupils because it was thought that they could be able to respond to items in the questionnaire with less assistance and with little difficulty.

Secondary school students: The term was used to refer to learners in secondary schools in forms 1, 2, 3 or 4.

Skill: Manipulative or intellectual operation performed with learned competence, for instance intercropping of compatible crop plants with woody tree components and rearing of animals in the same piece of land.

Stakeholders: In this study, the term referred to the various persons or organisations that by virtue of being interested or beneficiary of the FoF programme will decide on the administration and implementation of FoF activities. In FoF programme, learners, World Agroforestry Centre and farming communities are the main stakeholders.

Sustainable development: The improved modification of the biosphere to satisfy human needs and improve the quality of human life as well as ensuring intergenerational equitable distribution of the available resources. In this study sustainable development meant practising farming aiming at optimum output but at the same time maintaining the natural status of the soil, water sources and the atmosphere. This can be achieved through practising agroforestry.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides a review of literature related to the Farmers of the Future programme, natural resources management, agricultural education and the different agro-ecological zones in Kenya that form rationale for integration of natural resource management in the curriculum.

2.2 The Farmers of the Future (FoF) Initiative

The Farmers of the Future initiative is facilitating the integration of agriculture agroforestry and natural resource management into basic education. In the year 2002, the World Agro forestry Centre in conjunction with Swedish International Development Agency's Regional Land Management Unit (RELMA) and other partners came up with a strategic document for the collaborative implementation of the initiative in Kenya. The programme was first implemented in some 29 selected primary and secondary schools in the western region of Kenya covering four districts, namely; Vihiga, Bondo, Kisumu and Siaya. The Farmers of the Future initiative is striving to improve the preparedness of youths in natural resources management and life skills by:

- improving agricultural and natural resources management knowledge skills and attitudes;
- enhancing effectiveness of formal and non-formal education through active experiential and conceptualised learning;
- promoting the integration of sustainable natural resources management into basic education;
- linking with and making good use of existing national and global policy framework such as "Education for All" and "Food for All;" and
- strengthening linkages between schools, homes and communities, particularly in rural areas (Vandenbosch et al., 2002).

The World Agroforestry Centre's new "Farmers of the Future (FoF)" initiative is aimed at facilitating the integration of natural resources management into basic education, contributing to the improvement of rural livelihoods, land use management and environmental conservation, while bringing direct benefits to all learners, their families and communities. Providing children with a wide array of knowledge and skills related to land, soil and water management, as well as enhancing positive attitude towards sustainable agriculture and rural life, will prepare them better for new challenges in farming and related enterprises.

The Farmers of the Future initiative intends to achieve these goals by:

- improving agricultural and natural resource management knowledge, skills and attitudes of youth;
- enhancing effectiveness of formal and non- formal education through active, experiential and contextualized learning;
- promoting the integration of sustainable natural resource management into basic education;
- linking with and making good use of existing national and global policy frameworks such as "Education for All" and "Food for All;"
- strengthening linkages between schools, homes and communities, particularly in rural areas;
- encouraging local and regional collaboration and networking through flexible participatory multi-stakeholder approaches.

Although Farmers of the Future is a very recent initiative at the World Agroforestry Centre, experiences from ongoing work in Kenya, Uganda, Tanzania, Malawi, Zimbabwe, Mali, Philippines and Thailand have shown the following key lessons:

2.2.1 Tangible benefits of the Farmers of the Future initiative

In many countries, introducing agriculture into schools has bad connotations, largely due to bad experiences in the past whereby agriculture was introduced as a labour intensive and punitive subject. This initiative is demonstrating that there are tangible benefits for the learners, parents, educators and the community. Participation by staff, students and parents is more assured if there are tangible incentives or benefits derived from this initiative. Such

benefits include skills in tree nursery management, provision of seeds, invitation to seminars on agroforestry and natural resources management among others (Vandenbosch et al., 2002).

2.2.2 Partnerships

Due to the interdisciplinary nature of natural resource management education projects, collaboration between different agencies is essential. A common element in the success of youth programmes is indeed collaboration between different organizations. Project development should address a recognized need. Therefore, all relevant stakeholders are consulted in project design, implementation and evaluation. Awareness creation is also a key factor for sustainability of such initiatives. All these are integral roles of FoF initiative (Noordin, Niang, Jama, & Nyasimi, 2001).

2.2.3 School-community linkages

Making use of indigenous technical knowledge (ITK) allows for incorporation of local culture, social and historical issues into the programme. Effective projects empower local communities and use their expertise. Projects succeed only with the will and support of the people. There is a variety of ways to involve local communities, including helping them to assess their situation and viewpoints, encouraging their suggestions, enabling them to make good decision, and helping them to share in the benefits. FoF initiative is involving farmers in all the deliberations related to sustainable land use.

2.2.4 Teacher training and education materials

Teacher training is a key factor for successful education programmes. Teachers need to develop new knowledge, at both practical and theoretical levels. In addition, they often need to learn new instructional techniques and new skills in working outside the classroom. A wide variety of newsletters, posters, magazines, pamphlets and teachers' guides are being circulated to all the schools covered by the FoF programme. Quality materials are critically important in the creation of awareness towards sustainable agriculture (Noordin et al., 2001; Vandenbosch et al., 2002).

2.2.5 Gender and rural development

Women's groups often serve useful advocacy roles in communities. To be successful, an education programme needs to address the importance of gender. World Agroforestry

Centre is in the forefront in campaigning for gender parity in education. Gender, agriculture, natural resource management and environment are inextricably linked.

2.3 The Farmers of the Future Programme and other School Based Agriculture Clubs

It is notable that FoF incorporates other school-based clubs to enhance natural resource management. The initiative is unique in that it is an international programme and experiences from member countries are used to improve the activities of the programme. FoF's main goal is to enhance basic education through integration of natural resources into the school curriculum. FoF is closely working with 4-K clubs among other agriculture clubs. Five major goals of 4-K clubs are:

- teaching youth improved methods in agriculture;
- teaching youth to appreciate agriculture as a dignified profession;
- help youth to produce food for home consumption and for sale;
- to develop leadership among the youth; and to
- enhance efforts to change adult farmers' attitudes and practices towards profitable farming (Noordin et al., 2001; Vandenbosch et al., 2002).

Young Farmers clubs in secondary schools have similar goals but are a bit elaborate due to the level of the education of the learner.

2.4 Natural Resource Management

The management of natural resources and sustainable agriculture is an interdisciplinary course. It includes animal husbandry, crop husbandry, forestry, soil, and water management. Trees are major resources in Kenya mainly in rural areas, providing food in form of fruits, soil conservation, fuel, as well as providing feed for the livestock.

Ngonda (1988) noted that rural households in Kenya face two basic problems:

- poor food production systems that are always under stress; and
- a critical shortage of domestic energy.

Wood is the major source of fuel in rural Kenya and with high population densities and very small farms, the pressure on the agricultural land resources is severe.

About 85% of Kenya's population depend on fuel wood or charcoal for domestic needs with high levels of wood fuel consumption being linked to deforestation, soil erosion, and a low annual rainfall leading to low agricultural farm yield (Muturi, 1982). This makes it imperatively important to create awareness amongst the old and the young people in the rural areas about the management of this valuable resource.

Hosier (1985) suggests that rural households in Kenya are in the midst of transition from traditional sustainable systems of production to a capitalistic one. Based on evidence from studies already done in Kenya and India, hosier concluded that if the transformation to capitalism is really a dominant process in rural Kenya, then it should be reflected in the use of energy as a critical resource for rural production. Therefore, the rural people should be empowered with knowledge on how to utilize the resource in a sustainable way.

Owino (1981) noted that natural and cultivated forests cover some two million hectares, which is less than three percent of the national land base. Attitude towards and knowledge of a given farming technology by farmers are main determinants of the adoption rate. Sands (1986) noted that with positive attitude and awareness of a given technology, Kenyan farmers have a high adoption rate. In the past however, traditional agriculture research put crops in the centre of development leaving out the farmers. Also until recently, very little attention had been given to the role of trees in the farming systems (Ngoda, 1988). Through FoF however, World Agroforestry Centre has come in to involve farmers in the development as well as incorporating trees in the farming systems. This is a very important approach in the management of natural resources for sustainable farming.

2.5 Gender and Natural Resources Management

The gender issues in relation to agroforestry and natural resources management covers the roles that male and female family members play in tree planting, tending and harvesting and also conservation of the natural resources mainly soil and water (Korir, 2002). In different societies, there are differences in responsibilities, user rights, legal status, division of labour and decision making on gender basis. These factors can therefore, influence the perception of the young people towards agroforestry and natural resources

management. In this research therefore, gender discrepancy in perceptions towards natural resources management among the learners is of interest.

2.6 Learners' Perceptions towards Sustainable Agriculture

The early missionaries with the main aim of spreading Christianity started formal schooling in Kenya. Consequently, the missionaries started establishing schools in which simple academic training as well as catechism were taught (Kathuri, 1990). The ingenuity of the concerned missionaries determined the kind of the school curriculum to be adopted. As in other African countries, the formal education offered had little to do with social and economic advancement of the Africans. Lopokoiyit (1995) observed that perception of learners towards agriculture is enhanced by an appropriate curriculum. According to Oluoch (1982), curriculum is all that is planned to enable learners to acquire and develop the desired knowledge, skills and attitudes. Nyerere (1979) observed that education provided by the colonial government was not designed to prepare young people for the service of their own country, instead it was motivated by desire to inculcate the values of the colonial society and to train individuals for the service of the colonial state. The history of agriculture as a subject in the post-independent Kenya school curriculum has been highly controversial, with political leaders disagreeing among themselves as to whether agricultural instructions in schools were useful (Ngumy, 1984).

Ngesa (2002) pointed out that post-independent governments in Kenya have promoted school agriculture despite the first education commission headed by Ominde in December 1963, having come out against school agriculture. However, the importance of agriculture to the Kenyan society makes it imperative that students develop an appreciation for its central role in nation building (Kathuri, 1990). It is therefore, imperative that the instructional approaches used by the teachers contribute significantly to the learners' perceptions toward agriculture, (Kibett, 2002). An approach to learning according to Biggs (1990) refers to a combination of the intention of learning and the strategies used to achieve that intention.

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 has been observed that achievement of pupils in developing countries is

much more influenced by factors or resources within the reach of the pupil than in the case of developed countries where learning resources are abundant (Farrel, 1993).

2.7 Constructivism and Experiential Learning in the Farmers of the Future Initiative

Constructivism theory of learning asserts that knowledge is not simply transmitted from the teacher to learners but constructed by learners. Learners attempt to understand new content by relating it to their own experience; they are therefore, not just passive learners (Kelly, 1997). FoF seems to borrow much from constructivism theory of learning in implementing its school programme. In FoF programme, learners are encouraged to be innovative in natural resources management at school as well as at their homes. They are particularly encouraged to plant and take care of trees as well as to engage in soil and water conservation. Constructivism is a theory of knowledge acquisition which argues that knowledge is built up by the learners through active involvement in the learning process (Driver, Asoko, Leach, Mortimer, & Scott, 1994).

FoF employs the theory of experiential learning where learners are actively involved in planning and implementing of the learning activities. According to Walter and Marks (1981), experiential learning refers to the teaching-learning process in which learners are actively involved in the planning of learning activities, gathering and analysing information and using the subject matter. Several studies confirm that experiential learning enhances learners' participation in the learning process hence better performance (Ngesa, 2002). This is one of the guiding principles of FoF programme in Kenyan schools.

2.8 The Fundamentals Guiding the Operations of Farmers of the Future Programme

Sustainable agriculture and natural resource 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). With the core mission of enhancing basic education through the integration of natural resource management, the Farmers of the Future programme developers have brought together ten fundamental elements, which form the conceptual framework that provides central elements of successful interventions. Each fundamental element interacts and inter-relates systematically with the other elements. The elements are however, not necessarily equally addressed. The extent of priority will depend on the context and/or the specific situation. Nevertheless, the framework itself serves as a yardstick for evaluation and design of farmers of the future interventions.

The developers of the frameworks see the need to reassess the contents and delivery of land use education programmes in relation to technologies and practices used by small-scale farmers in Kenya. Farmers of the future are made to realize that education; research and extensions services must be coordinated to assist the small-scale farmer to implement rural transformation. All the parties involved in this systematic joint learning process can benefit from the synergy generated which is superior to individualized working.

The interdisciplinary nature of natural resources management education projects and collaboration between different agencies is essential. Sustainable development is a well interwoven multidisciplinary area that requires a well coordinated framework. Therefore, all relevant stakeholders are consulted in project design, implementation and evaluation. A common element in the success of youth programmes is indeed collaboration between different organizations.

Project development should address a recognized need. FoF is addressing the need to empower the school-going youth with life long-skills in sustainable agriculture. Awareness creation is also a key factor for sustainability of such initiatives. All these are integral roles of FoF initiative (Vandenbosch et al., 2002). The fundamentals that guide the operations of Farmers of the Future programme are summarised in Figure 1.

Figure 1 gives a conceptual framework of the fundamental elements that guide FoF in enhancing basic education through the integration of natural resource management into the school curricula.

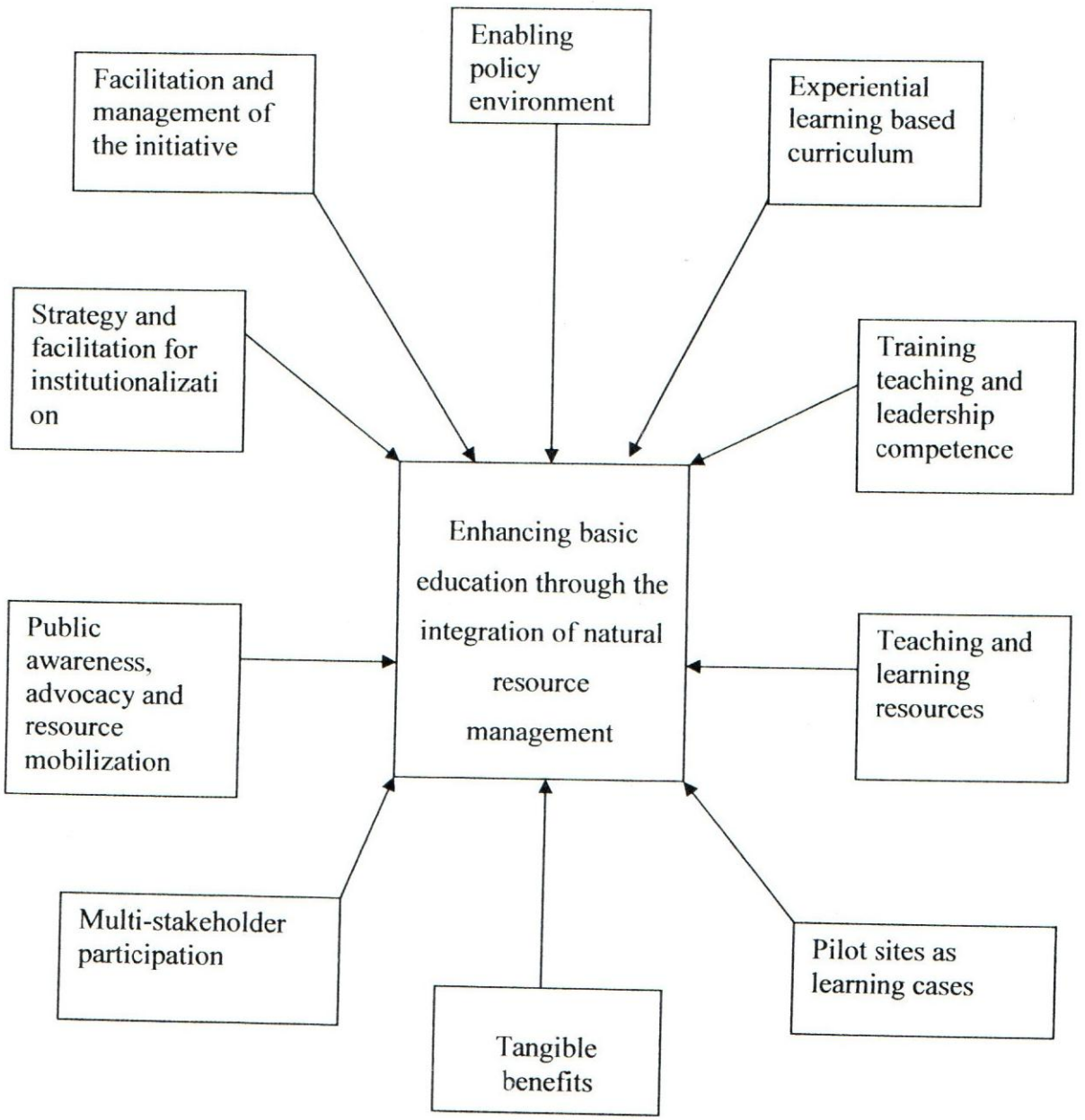

Figure 1: Fundamentals of the Farmers of the Future Programme (Vandenbosch et al., 2002).

2.9 Agro-Ecological Zones in Kenya and Natural Resources Management

Kenya has a diversified topography ranging from coastal flatlands and upland plateau to the steep slopes and high peaks of the mountain ranges. The altitude ranges from sea level at Mombasa to over 5000m above sea level on Mt. Kenya (Warner, 1993).

Six agro-ecological zones have been identified in Kenya. Rainfall is crucial for agriculture and among other factors; it is the most limiting in Kenya where only 15 percent of the country receives a reliable 750mm per annum (Lundgren, 1975). It is therefore imperative to create a positive attitude in learners towards agroforestry and natural resource management. Afforestation particularly does enhance amount of rainfall received annually. Table 1 shows the area in percent of the various agroecological zones in Kenya. From the table, it is evident that there is a need to improve the potential of the vast marginal area through enhancement of natural resource management.

Table 1. Agro-ecological zones of Kenya

Zone	Description	Agricultural potential
i) Afro-alpine	High altitude montane	Low
ii) Highlands-humid zone	Central, western, Taita etc about 9% of Kenya	High
iii) Sub-humid/ semi arid	Fringes of the humid highlands coastal strip, about 9% of Kenya	Medium/high
iv) Semi arid	Inland coastal areas, lake Victoria foot hills	Medium
v) Arid	Most extensive zone in the country 52% of Kenya	Low
vi) Very Arid	Drier less reliable rainfall 22% of Kenya	Low

Source: Lundgren (1975).

2.10 Agroforestry for Sustainable Development

Agroforestry (AF) is a fairly recent agricultural practice that involves various land-use systems in which trees are deliberately grown on the same land with agricultural crops, and livestock. This can either be in a spatial arrangement or a time sequence and in which there are both ecological and economical interactions between the trees and non-tree components (Young, 1986). In the above definition tree is used to refer to woody plants, comprising trees, shrubs and bamboos. Economic interactions refer to ways in which production from trees can help to balance the supply of the farmers' basic needs of food, fuel, shelter, cash income and investment needs.

Ecological interactions are the effects such as shading of crops by trees, live fences and provision of shade for livestock. A misconception persists in some people and in particular, educators, that agroforestry refers to one or a small number of specific practices, for instance intercropping trees with food crops. There is however, a wide range of agroforestry systems and practices that teachers can adopt so that they can empower learners with lifelong skills for sustainable agriculture (Nair, 1985).

An agroforestry practice is an arrangement of components of trees crops, pastures and livestock in space and time (Young, 1985). World Agroforestry Centre initiated Farmers of the Future programme in western Kenya to integrate principles of agroforestry and natural resource management in the school curriculum so as to create awareness hence better utilization of natural resources that have for a long time been misused. It is thought that the success of the Farmers of the Future programme in western Kenya and later in the rest of the country will make a landmark in rural poverty eradication.

2.10.1 Origin of agroforestry

Forests were the largest terrestrial ecosystems on earth with favourable environmental conditions and plentiful biological resources. They served as a cradle of human civilization and a base for birth of agriculture and forestry (Hsiung, Tao, & Yang, 1995). Ancestors of many countries in the world began by living in the forests. This is where they took shelter and protected themselves from any possible attacks. The first turning point occurred during this period where ancestral activities shifted from simple instinct for survival to more

intelligent thinking as demonstrated in the making of wooden and stone tools and the improvement of hunting and gathering. Domestication of plants and animals therefore, started (Hsiung et al.). Based on this literature, it is therefore, relatively true to say that agriculture originated from early practices and on forested land. Agriculture was therefore, related to forestry activities.

During this period, the practice of slash-and-burn cultivation developed where early people used this method for hunting and opening up new areas for cultivation (Sirois, Margolis, & Camire, 1998). The unburnt-forested areas on the other hand became places for gathering wild fruits, hunting and breeding animals (Hsiung et al., 1995). This is the earliest primitive form of Agroforestry. Because slash-and-burn involved farming a cleared forested land and consequently shifting to new uncleared areas, this aggravated erosion and rapid decrease of crop yields. This degradation of the land resource led to reformation and development of farming practices. With population increase, slash-and-burn was no longer the main farming system except in less populated but abundantly forested underdeveloped areas. Since then population has grown steadily leading to a more settled kind of arable farming which has also led to decrease in arable land, development of industries and deterioration of the environment (Hsiung et al.).

2.10.2 Modern agroforestry

Modern agroforestry is concerned with the systematic placement of trees relative to crops and pasture unlike the indigenous AF which was concerned with how the AF fitted into the whole system (Chambers, Pacey, & Thrupp, 1989). In many cases farmers have longer experience and knowledge of AF practices than scientists. Successful AF programmes can only be achieved if emphasis is placed on priorities, knowledge, innovative capacities and full participation of the local people in research and development (FAO, 1987). These programmes should take into account key attributes such as adaptability to local conditions, adoptability by farmers and genetic diversity. The challenge is therefore, to encourage, support and supplement the rural peoples' own innovations in ways which combine these elements (Chambers et al.). The local people have comparative advantage over the researchers as they know and use the whole system in all their diversity and variability and as

clients they know what will meet their needs and interests and they are well placed to adapt and adjust AF components over time (Nair, 1989). It is on this premise that the World Agroforestry Centre is working closely with local people and school going youth in order to hasten sustainable farming in the western region of Kenya.

Agroforestry research should therefore, carefully integrate existing local practice with the science of designing and testing new practices in learning institutions and in the agricultural farms. Researchers and educators should involve themselves as consultants and catalysts in the process of research, education, extension and evaluation of agroforestry technologies (Johnson, 1992). Modern AF research has embarked on a coordinated approach to develop a regional research initiative to intensify the indigenous strategies (Cairns & Garrity, 1999). The approach emphasizes on indigenous knowledge and practices, which act as a point of departure in the search for pragmatic and adaptive solutions to intensify and reinforce sustainability in farming practices (FAO, 1987). Researchers perceive this as a promising approach that builds on the indigenous technical knowledge (ITK) that must be added into their repertoire of technical responses to declining productivity (Cairns & Garrity, 1999).This research holds that integration of such ITK in the school curriculum will enhance positive perceptions of learners towards natural resources management.

2.10.3 Integrating agroforestry and natural resources management into the school curricula

Although agroforestry is now well established as a scientific field, its role in sustainable agricultural development would be enhanced considerably if its concepts were formally integrated into the curricula of primary schools, secondary schools, agricultural training colleges and universities. The natural forest has traditionally been an integral part of the livelihood of smallholder agricultural populations in many African countries as a source of products such as building materials, medicines, fruits, wildlife and leaf litter manure. However, population pressure has destroyed this harmonious mutual coexistence resulting in progressive depletion of the natural forest and natural resources in general and as a result diminishing livelihoods (Mapfumo, 2000).

Agroforestry contributes towards sustainable agricultural and forest ecosystems through the objective integration of trees and shrubs into crop and livestock farming systems. It depends on the proficiency of scientific research in producing appropriate agroforestry technologies. The success of agroforestry approaches is crucial for sustainable agriculture. Its impact on livelihoods however, depends on its acceptance by youths who are inevitably the farmers, development specialists, and policy makers of tomorrow. World Agroforestry Centre through the FoF programme is spearheading sustainable development by integrating natural resources management into the school curricula in Kenya.

2.10.4 Agroforestry research findings and contributions to sustainable agricultural development

Research from various southern tropical countries including Kenya has identified beneficial tree and shrub species and developed promising technologies for integrating them into the crop and livestock farming systems. Trees for commercial production of fruits and construction poles have diversified rural incomes. Multipurpose trees and shrubs for production of high protein fodder offer affordable opportunities for intensifying smallholder commercial dairy production.

Tree species which fix nitrogen offer great prospects for improving crop yields through either rehabilitation of fallowed lands or direct transfer of nutrients to the crop system through incorporation of enriched biomass or 'green manure' into the soil. Pilot schemes in Zambia showed improved fallows of two year duration under *Sesbania sesban* trees raising yield of the first maize crop by 400% to 4 tonnes/hectare compared to 0.9 tonnes/hectare under traditional farming practice. At Domboshawa training centre in Zimbabwe, incorporation of pruning of agroforestry trees into the soil resulted in 300% improvement in maize yield from 1 tonne/hectare to 3 tonnes/hectare (Moyo, & Ayuk, 2000).

World Agroforestry Centre is in the forefront in enhancing agroforestry and natural resources management in farming communities in Kenya and other parts of the world. In Kenya, the World Agroforestry Centre is involved in school programmes to educate the learners on management of natural resources in rural areas. FoF programme is one of the

promising and effective programmes that are championing agroforestry and natural resources management in developing countries.

The agroforestry innovations are notably effective in enhancing incomes and livelihoods of resource-poor farmers for whom inorganic fertilizer and purchased protein concentrates are not financially feasible options. Resilience of agroforestry technologies in the face of droughts also offers small scale farmers an added incentive for incorporating them into the farming system (Noordin, Niang, Jama, & Nyasimi, 2001).

2.10.5 Role of formal education in disseminating natural resources management technologies

Despite quality research findings, integration of agroforestry into farming systems has been hampered by lack of knowledge among agricultural policy makers, extension workers, development agencies and farmers. While many efforts have been made at providing opportunities for short-term in-service training of extension workers and development practitioners, these courses have failed to generate the desired impact towards acceptance of agroforestry innovations as part of sustainable farming systems (Mapfumo, 2000). ICRAF through FoF programme is involving school going learners in the implementation of natural resources management technologies at school level and out of school.

A massive transformational education and training system which fully recognizes innovations and institutionalizes paradigm shifts is required to produce a new cadre of future farmers, extension workers, policy analysts and policy makers required to move from agroforestry demonstration plots to having agroforestry at the centre of sustainable agricultural development. The mainstream education system, from primary school, secondary schools to tertiary agricultural institutions, offers the greatest opportunity for integrating agroforestry and sustainable farming systems into the formal educational curriculum. World Agroforestry Centre is working closely with the Ministry of Education in integrating agroforestry and natural resources management technologies into the school curricula in Kenya (Vandenbosch et al., 2002).

Other notable organizations involved in the integration of agroforestry and natural resources management into the school curricula in southern Africa are the Agroforestry Southern African Project (AFSA) and the National Agroforestry Steering Committees (NASCO). These two organisations have developed a model curriculum for teaching Agroforestry in tertiary agricultural and forestry colleges. Implementation of these course materials as part of agricultural curricula has marginal budgetary and staff implication (Mapfumo, 2000).

2.11 Opportunities for Higher Education for Farmers of the Future

The African Network for Agroforestry Education (ANAFE) was formally launched in April 1993. The objective of ANAFE is to strengthen the capacity of colleges and universities to develop and deliver quality agroforestry education. ANAFE receives its financial support from Swedish International Development Corporation Agency (Sida) and World Agroforestry Centre. Some of the activities of ANAFE are:

- assessing training needs;
- reviewing curriculum to incorporate agroforestry, social forestry, community, forestry and environmental education;
- training of trainers through short courses and postgraduate fellowships.
- developing teaching materials;
- involving Non-Governmental Organizations (NGOs), farmers, researchers and policy makers in education programmes;
- formulation of mechanisms for National Agricultural Research Systems (NARS) and universities to collaborate in research and postgraduate training;
- incorporating research findings into teaching materials;
- improving interaction and cohesion among members of ANAFE through joint programmes;
- identifying and developing field training facilities for students; and
- strengthening and increasing sources of support to ANAFE (Temu, Rudebjer, & Zulberti, 1996).

ANAFE programmes are run in a holistic manner and thus there is existence of inter-linkages among the several activities. The ten fundamentals of Farmers of the Future programme are

addressed by ANAFE within its work plan. This acts as a motivator for members of Farmers of the Future for higher education.

2.12 Variables and the Conceptual Framework of the Study

This study sought to investigate the effects of the Farmers of the Future programme on learners' perceptions towards natural resources management. Exposure to Farmers of the Future programme meant learners' contact with any information or activities that are initiated by Farmers of the Future initiative in their school. Exposure to FoF programme was one of the independent variables in this study. Other independent variables of the study were gender of the learner and teacher's involvement in the FoF programme.

Dependent variable was the rating score of learners' perceptions towards natural resources management. It was measured on a five-point likert-scale. The research was confined to one dependent variable so as to allow an in-depth study of FoF's effects on learners' perceptions towards sustainable development. The school location, the school administration, learner's socio-economic background and other club activities were the main extraneous variables in this study. The effect of extraneous variables was controlled through random sampling of schools and respondents from which data were collected.

The relationship between variables is depicted in Figure 2.

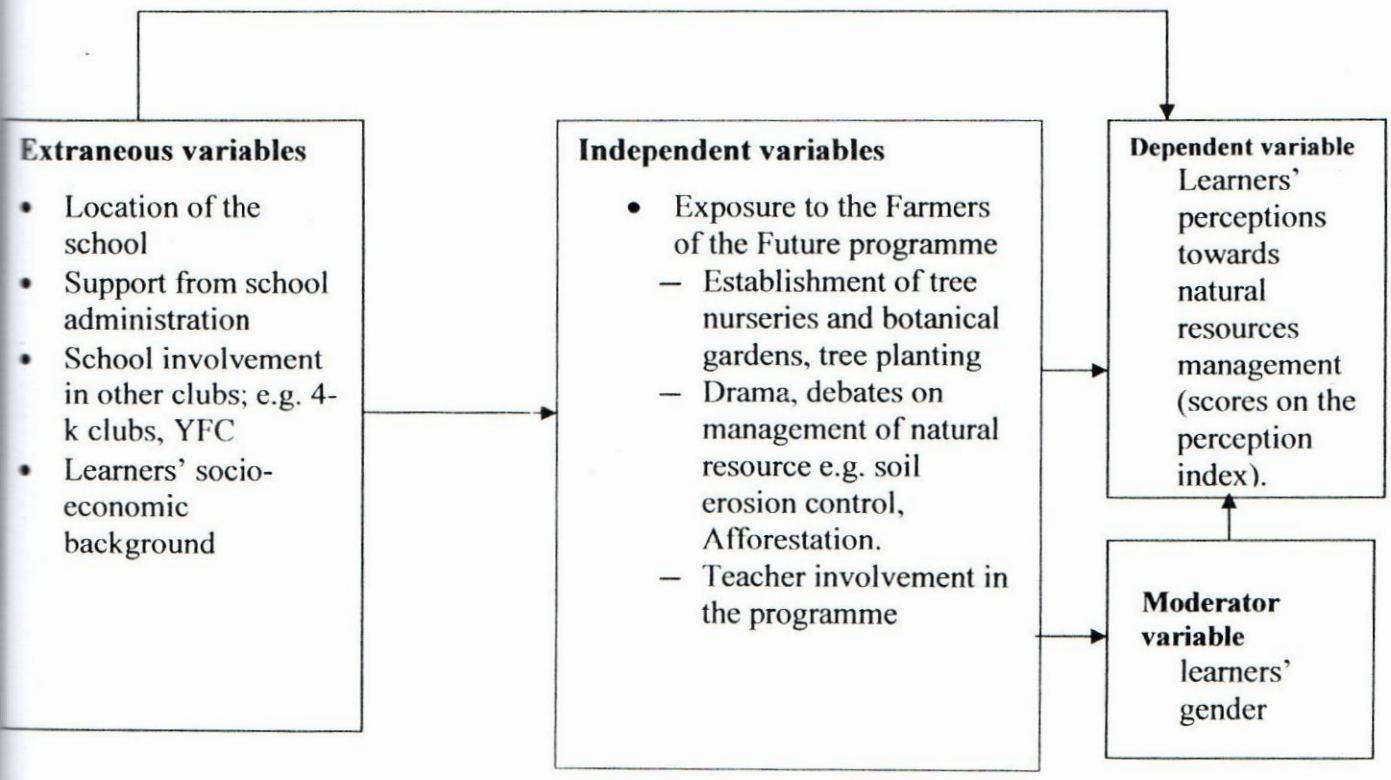

Figure 2: Conceptual framework of the study related to learners' perceptions towards natural resource management as a result of exposure to FoF programme

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter gives a brief description of the research procedures that were adopted in the study. The chapter is divided into eight sections; research design, area of study, population, sample and sampling procedure, instrumentation, data collection and analysis.

3.2 Research Design

This study employed an ex-post facto design. Ex-post facto design involves examination of the effects of a naturally occurring treatment and the researcher introduced no new treatment (Tuckman, 1978). 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's activities and the effects that they had already caused on the learners' perceptions towards natural resources management.

3.3 Location of the Study

The research was conducted in the western region of Kenya in four districts, namely; Siaya, Kisumu, and Bondo in Nyanza province and Vihiga in western province. A total of 29 schools from the four districts were involved in the FoF programme. The FoF programme involves primary school pupils and secondary school students who are members of environmental or agriculture related clubs in their school. Patrons of these clubs who are teachers in the respective schools were also involved. The Farmers of the Future programme has only been implemented in the western region of Kenya so far but has a potential of expansion to other regions of the country. The schools involved in the study are likely to be experiencing similar environmental conditions and actually use the same school curricula which are prepared by the Kenya Institute of Education.

3.4 Population

The target population of the study was upper primary school pupils in classes 6, 7 and 8 which comprised of a total of 643 pupils and secondary school students in forms I-IV who comprised a total of 472. All those involved were members of environmental clubs, young farmers clubs, wildlife clubs and other related clubs and their patrons in which FoF initiative has been incorporated. A total of six secondary schools and six primary schools were involved in the study. Three primary schools and three secondary schools were randomly selected from the schools that were involved in the FoF programme while the other six schools were composed of three primary schools and three secondary schools randomly selected from schools that were not involved in FoF programme.

3.5 Sample and Sampling Procedure

Clustered stratified sampling procedure was used to get the sample from the population. One cluster consisted of six schools that were involved in FoF programme. This cluster had two strata; primary schools stratum and secondary schools stratum with three schools each. The second cluster consisted of six schools that were not involved in FoF programme. It had two strata also; primary schools stratum and secondary schools stratum with three schools in each as well. Twenty respondents from each participating school were randomly selected for inclusion in the sample. One patron teacher from each participating school in the study was included in the sample giving a total of twelve teachers. This gave a total sample of 252 respondents which comprised of 240 learners and 12 teachers. Selection of learners for inclusion was done through simple random sampling method. A learner had to be a member of agriculture, environment or wildlife related club so as to be included in the study. FoF incorporates these clubs in its activities.

The sample size was adopted in accordance with recommendations given by Kathuri and Pals (1993) for the minimum sample size. They recommended that for a survey type of research, a minimum sample size of 100 for each major subgroup and 20-50 for each minor subgroup should be used. They also recommend that the size of a sample should be sufficiently large to allow accurate interpretation of the results and at the same time ensure that the data is manageable. In this study, the sample size therefore satisfied recommendations by Kathuri and Pals (1993).

3.6 Instrumentation

Instruments were developed so that they had items to help in achieving the purpose and the objectives of the study. There were five sets of instruments that were used for data collection; a questionnaire for primary school pupils, a questionnaire for secondary school students, an interview schedule for primary school teachers, an interview schedule for secondary school teachers and a researcher's observation schedule.

The questionnaires for primary and secondary school learners solicited information on learners' perceptions towards natural resource management, membership to FoF programme, and the activities of the FoF initiative in the respective schools. The observation schedule and the teachers' interview schedules were used to obtain corroborative information on learners' membership to FoF programme and the related activities.

3.6.1 Validity

The researcher presented the developed instruments to two experts in the Department of Agricultural Education and Extension at Egerton University and one expert from ICRAF for review and necessary corrections. The Egerton University experts are lecturers who have been teaching agricultural education to post-graduate students. They also have adequate experience in research gained through supervising and guiding post-graduate students. The ICRAF expert has a wide experience in agricultural and environmental programmes in learning institutions. He is the coordinator of the Farmers of the Future initiative in Kenya and is based in Nairobi. The questionnaires were developed through researcher's experience and review of literature, particularly the one related to perceptions towards agriculture and sustainable development. Reference was given to literature from the World Agroforestry Centre (ICRAF) to strengthen the instruments. This improved the validity of the instruments.

The validation procedure that was adopted by the researcher to ascertain the validity of the questionnaires is in agreement with Borg and Gall (1989), who recommend experts judgement in validation of research instruments. Their recommendation says that two content specialists shall give independent assessment of the relevance and representativeness

of each item within a given domain. The main domains of validity that were ascertained by the experts were face and content validity.

3.6.2 Reliability

Reliability was tested through pilot testing where thirty primary school pupils and thirty secondary school students were involved. The schools that were involved in reliability testing of the instruments were not included in the actual instrumentation. Cronbach's alpha was used to determine the reliability of items. Reliability coefficient of 0.716 was realised in primary school pupils' instrument and 0.710 for secondary school students' instrument. Both were above the reliability coefficient of 0.70 thresholds as recommended by Koul (1993).

3.7 Data Collection

Upon approval of the proposal by the Faculty of Education and Human Resources through the Graduate School, Egerton University, the researcher sent introductory letters to the selected schools briefing them on the purpose of the study and the actual date for data collection. The researcher was granted a research permit from the Ministry of Education Science and Technology, to conduct the research in schools in western region of Kenya for a period ending on March, 2005. The instruments were then delivered to the respective schools and collected in the month of February, 2005.

3.8 Data Analysis

The data collected from the learners' questionnaires were scored by the researcher. The responses were rated on a five point Likert scale. The legend used in rating were; strongly disagree (SD), disagree (D), undecided (U), agree (A), and strongly agree (SA). Some items were stated positively and others negatively. This was done to minimise chances of pattern answering of the items by some respondents. Sorting out of the positive and negative items in the questionnaires was done manually before coding of the data for analysis. In the scoring of the negatively stated items "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. Comparison of scores of learners involved in FoF and those not

involved was done in primary schools and secondary schools in order to ascertain their perceptions towards natural resources management. Comparison of perceptions of learners by gender in primary schools and secondary schools involved in FoF was done. Means and standard deviations were generated to describe learners' perceptions towards natural resources management. The results were analysed using descriptive and inferential statistics. Descriptive statistics that were used were frequencies and percentages. T-test inferential statistics was used to test the four hypotheses for differences between means of two independent groups from the data that were derived from the learners. T-test is a reliable analytical tool where two distinct categories of data are compared (Ary, Jacobs, & Razavieh, 1972). T-test was therefore adopted in this study because only two groups of data were considered for each hypothesis. The null hypotheses of the study were tested at 0.05 level of significance using t-test. Computation of the data was done using Statistical Package for Social Science (SPSS). Table 2 provides a summary of the analysis procedures.

Table 2. Summary of data analysis

Hypotheses	Independent variables	Dependent variables	Method of data analysis
H_{O1}: There is no significant difference in perceptions towards natural resources management between primary school pupils exposed to the FoF programme and those not exposed.	. Exposure to Farmers of the Future (FoF) Programme.	Perceptions towards natural resources management.	t-test
H_{O2}: There is no significant difference in perceptions towards natural resources management between secondary school students exposed to the FoF programme and those not exposed.	. Exposure to Farmers of the Future (FoF) Programme.	Perceptions towards natural resources management.	t-test
H_{O3}: There is no significant difference in perceptions towards natural resources management by gender among primary school pupils who are exposed to FoF programme.	**Independent variable** . Exposure to Farmers of the Future (FoF) Programme. **moderator variable** . Gender of the learner	Perceptions towards natural resources management.	t-test
H_{O4}: There is no significant difference in perceptions towards natural resources management by gender among secondary school students who are exposed to FoF programme.	**Independent variable** . Exposure to Farmers of the Future (FoF) Programme. **moderator variable** . Gender of the learner	Perceptions towards natural resources management.	t-test

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents research findings of the study on the effects of the Farmers of the Future (FoF) programme on learners' perceptions towards natural resources management in selected schools in western region of Kenya.

The data were collected from primary and secondary school learners who are members of environmental or agriculture oriented clubs. FoF draws its participants from members of these clubs in the schools that are involved in the programme. Patrons to these clubs in their respective schools also provided information on the activities of their clubs. A half of the respondents who provided the data were drawn from the schools that were involved in the FoF programme hence exposed to the activities of the programme. The other half were respondents from schools not involved in the FoF programme.

The data were in the form of scores collected from questionnaires that were administered to learners. Primary school pupils responded to a different questionnaire from that of secondary school students. Both sets of questionnaires, for primary and secondary school learners, had one theme of perceptions towards natural resources management.

Each item in the questionnaires was rated by each respondent on a five point Likert scale, that is, strongly agree (SA), agree (A), undecided (U), disagree (D) and strongly disagree (SD). Some items in the questionnaires were stated negatively in relation to natural resources management. In such items, strongly disagree (SD) attracted 5 points and strongly agree (SA) 1 point. In the same questionnaire some items were stated positively in relation to natural resources management thus strongly agree (SA) scored 5 points while strongly disagree (SD) scored 1 point only. This scale was used to calculate the mean score and standard deviation in each questionnaire. The scores obtained from the questionnaire were tabulated and analysed using SPSS computer programme. Firstly, the data were subjected to

descriptive statistics in order to determine the mean and standard deviation of score respondents. Secondly, the data were subjected to inferential statistics (t-test) in order to test the four hypotheses. The level of significance was set at $p = 0.05$.

Results of various analyses are presented in this chapter. Each presentation is followed by a discussion of the results. For clarity of presentation of the research findings, the results are discussed following the order in which the objectives and hypotheses were stated in chapter one. Objective one had no corresponding hypothesis. However, objectives 2, 3, 4, and 5 corresponded with hypotheses 1, 2, 3, and 4 respectively. Each pair consisting of an objective and its corresponding hypothesis are discussed together starting with the objective then followed by the hypothesis.

4.2 Activities of the Farmers of the Future Programme in Kenya Schools

Data for this objective were obtained from schools that are covered by the Farmers of the Future programme. There were 3 primary schools and 3 secondary schools from which the data were obtained. The data were collected from questionnaires that were administered to learners who were involved in FoF activities and their patrons. The data for this objective were analysed by use of frequencies and percentages.

The results of the analysis are shown in tables 3, 4 and 5.

Table 3. Activities of the Farmers of the Future programme in Kenya primary schools

Activity	Primary schools	
	F	%
Planting cover crops	42	49.4
Soil conservation	40	47.1
Tree nursery management	37	43.5
Planting trees	32	37.6
Planting vegetables	31	36.5
Livestock keeping	4	4.7
Collecting seeds	3	3.5

(n=85)

Table 3 reveals that the most common activities in primary schools are planting of cover crops with a frequency of 42 which is equivalent to 49.4% of the primary school pupils who are involved FoF and responded to the questionnaire. Soil conservation (47.1%), tree nursery management (43.5%) and tree planting with a frequency of 32 accounting for 37.6% of the respondents.

Table 4 also reveals similar activities in secondary schools with the exception of seed collection. Nevertheless the frequencies of the various activities carried out by learners in primary and secondary schools varied to some extent. The study revealed that the most common activities in secondary schools in the order of their popularity were planting of trees with a frequency of 27 that is 31.8%, planting of cover crops with a frequency of 23 that is 27.1%, soil conservation 18.8%, planting vegetables 16.5%, keeping livestock 12.9%, and tree nursery management 11.8%. The results of the analysis are shown in table 4.

Table 4. Activities of the Farmers of the Future programme in Kenya secondary schools

Activity	Secondary schools	
	F	%
Planting trees	27	31.8
Planting cover crops	23	27.1
Soil conservation	16	18.8
Planting vegetables	14	16.5
Livestock keeping	11	12.9
Tree nursery management	10	11.8
Collecting seeds	0	0.0

(n=85)

Aggregated data from the responses of learners who were involved in the FoF initiative in both primary schools and secondary schools in Kenya on the type of activities they were involved in revealed similarity of activities regardless of the level of education, whether primary or secondary school. This is interesting in that secondary school students did not indicate unique activities from those carried out by primary school pupils.

This may be explained by the fact that FoF initiative incorporates both primary schools and secondary schools in western region of Kenya in similar activities. However, teaching and demonstration approaches in secondary school level are different from those in primary school. The theme is the same regardless of the education level, which is, creating awareness towards natural resources management and agroforestry and practising sustainable agriculture.

Learners in both primary schools and secondary schools that are involved in FoF initiative indicated involvement in similar activities. The education level of a learner, whether primary school or secondary school, may not have necessarily been of much influence on the activities that a learner was involved in. This could be explained by the fact that FoF has similar activities in both primary schools and secondary schools. It is hoped that involving learners in practical activities in agriculture will make them better farmers in the future. Secondary school students should be encouraged to carry on even more complex agricultural activities such as use of machines in farming activities, laboratory soil tests among others. This is due to the fact that certain research work has indicated that education level influences the farming activities among those people involved in agriculture with the more educated carrying out more sophisticated farming activities than the less educated (Waghmare, 1989).

The activities may however, vary slightly from one school to the other depending on the availability of resources in the schools. Chitere (1995) also observed that there exists a significant relationship between education level and the way people take on different farming activities, and therefore there is a need to involve secondary school students in more technical agricultural activities so as to prepare them to become better farmers in future.

Table 5 reveals that 38.2% of the total number of respondents indicated that they do plant cover crops, 34.7% reported planting trees, and 32.9% indicated that they are involved in soil conservation. From the Table, 8.8% and 1.8% indicted that they were involved in livestock keeping and seed collection respectively.

The data that were collected from the teachers using the interview schedule and that collected using observation schedule were intended for corroboration purposes. Of particular importance was the information related to membership to FoF and the activities of FoF initiative. These data were therefore, compared with those provided by the learners in their questionnaires. It was fascinating in that the information obtained from the interview and observation schedules was similar to that provided by the learners in the questionnaires. The other information contained in the interview and observation schedules was therefore, not reported in this study; however, it gave the researcher general information on the level of participation FoF initiative in the integration of natural resources management into the school curriculum.

Summary of the common activities of FoF as indicated by learners in primary and secondary schools in order of their popularity are shown in table 5.

Table 5. Activities of the Farmers of the Future programme in primary and secondary schools in Kenya in a combined order of their preference

Activity	Primary schools (n=85)		Secondary schools (n=85)		Total (n=170)	
	F	%	F	%	F	%
Planting cover crops	42	49.4	23	27.1	65	38.2
Planting trees	32	37.6	27	31.8	59	34.7
Soil conservation	40	47.1	16	18.8	56	32.9
Tree nursery management	37	43.5	10	11.8	47	27.6
Planting vegetables	31	36.5	14	16.5	45	26.5
Livestock keeping	4	4.7	11	12.9	15	8.8
Collecting seeds	3	3.5	0	0.0	3	1.8

4.3 Primary School Pupils' Perceptions towards Natural Resources Management

Objective two of the study was to describe and compare primary school pupils' perceptions towards natural resources management between those exposed to FoF programme and those not exposed. The data for this objective were gathered from primary school pupils using a questionnaire.

4.3.1 Scoring of items in the questionnaire

All the items that were subjected to descriptive and inferential analysis 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 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 items that were stated negatively in this questionnaire were:

- Some large forests in Kenya should be cleared to settle the landless people

  SD D U A SA

- I perform better in Kiswahili than in Agriculture.

  SD D U A SA

- I find it difficult to do what the 4-K club patron tells us.

  SD D U A SA

- I don't like agriculture.

  SD D U A SA

- Our parents should do business instead of farming as much as possible.

  SD D U A SA

- Teachers always force us to water the seedlings in the tree nursery.

  SD D U A SA

- I feel comfortable with teachers who teach Kiswahili and English than those who teach us Science and Agriculture.

  SD D U A SA

- Soil erosion will always take place even if people plant trees

  SD D U A SA

- Cleaning clothes in the river makes people save time for other jobs.

  SD D U A SA

- A debate on athletics is more entertaining than on pollution.

  SD D U A SA

- Cultivating next to the river can be very beneficial to farmers for a long period of time and therefore it should be encouraged.

  SD D U A SA

Scoring of the items which were stated positively had 'SD' attracting 1 point, 'D' 2 points, 'U' 3 points, 'A' 4 points and 'SA' the maximum of 5 points. The latter indicated very positive perceptions towards natural resources management.

Descriptive statistics for objective two are provided in table 6 and 7. From table 6, the pupils who were exposed to FoF programme indicated positive perceptions over those not exposed. It is only in item number 3 where pupils not exposed to FoF recorded higher mean value than those exposed to the programme. However, the mean difference between the two groups in the same item was low at 0.14. Pupils exposed to FoF had interestingly high mean scores in individual items particularly in items number 4, 5 and 13. Those exposed to the FoF programme had a mean score of 4.26, 4.60 and 3.59 respectively in the three items against 3.22, 3.75 and 2.49 respectively of those pupils not exposed to the programme. The positive perceptions towards natural resources management in individual items among pupils exposed to FoF programme indicates the potential of FoF programme in enhancing natural resources management among the school going pupils.

Table 6. Comparison of perceptions of primary school pupils towards natural resources management between those involved in FoF and those not involved by mean and standard deviation per statement

Statements on perceptions towards natural resources management that primary school pupils responded to.	Exposure to FoF initiative	Mean	Std. Deviation
1. Large forests in Kenya should be cleared to settle the landless	Not exposed	4.08	1.55
	Exposed	4.50	0.94
2. I perform better in Kiswahili than in agriculture	Not exposed	3.22	1.62
	Exposed	3.26	1.68
3. I like watching wild animals more than listening to music	Not exposed	3.88	1.47
	Exposed	3.74	1.56

Table 6.(contd)

4. I find it difficult to do what the 4-K club patron tells us	Not exposed	3.22	1.66
	Exposed	4.26	1.32
5. I don't like agriculture	Not exposed	3.75	1.56
	Exposed	4.60	0.90
6. Parents should do business instead of farming	Not exposed	4.07	1.45
	Exposed	4.40	0.94
7. Teachers force us to water the seedlings in the tree nursery	Not exposed	3.59	1.57
	Exposed	4.40	1.12
8. I feel more comfortable with Kiswahili and English teachers than Science and agriculture teachers	Not exposed	4.05	1.38
	Exposed	4.14	1.13
9. Soil erosion will always take place even if people plant trees	Not exposed	4.02	1.40
	Exposed	4.76	0.68
10. Cleaning clothes in the river makes people save time for other jobs	Not exposed	3.58	1.53
	Exposed	4.00	1.12
11. Planting and caring for the trees can be a hobby	Not exposed	4.12	1.29
	Exposed	4.74	0.78
12. Debate on athletics in more entertaining than on pollution	Not exposed	3.07	1.51
	Exposed	3.16	1.80
13. Cultivation next to river can be very beneficial to farmers and should be encouraged	Not exposed	2.49	1.56
	Exposed	3.59	1.57
14. We always take some time in the tree nursery with our club patrons	Not exposed	4.29	0.97
	Exposed	4.50	0.92
15. Am likely to become a successful environmental conservationist	Not exposed	4.47	1.01
	Exposed	4.88	0.33

The overall mean values in Table 7 indicated that pupils who were exposed to FoF had more positive perceptions towards natural resources management than those not exposed. Exposure to FoF programme may have contributed to the difference in perceptions of pupils towards national resources management indicated by the overall means in Table 7.

High mean value in an item in the instrument indicated better perceptions towards natural resources management. The findings of this study support Farrel's (1993) argument that academic achievement and learners' perceptions in developing countries are hampered by scarcity of resources. Learners who were not exposed to FoF initiative performed poorly compared to those involved in the imitative.

FoF initiative emphasises on sustainable exploitation of natural resources for sustainable development. The learners who are involved in FoF have more resources than those not involved in relation to natural resources education. This factor could have therefore influenced the outcome. Learners who are not involved in FoF initiative may actually not be exploiting the available resources in learning about the environment, as do those who are involved in FoF activities.

Table 7 shows the overall perceptions index of primary school pupils towards natural resources management of those exposed to FoF and those not exposed.

The overall mean for the primary school pupils who are involved in FoF was 4.1943 with a standard deviation of 0.3957 while the mean of those not involved in FoF was 3.7266 with a standard deviation of 0.6112. Those involved in FoF programme indicated better perceptions towards natural resources management.

Table 7. Perceptions index towards natural resources management of primary school pupils exposed to FoF programme and those not exposed

Exposure to FoF	Overall mean	Overall SD
Not exposed	3.7266	0.6112
Exposed	4.1943	0.3957

4.3.2 Hypothesis one: There is no significant difference in perceptions towards natural resources management between primary school pupils exposed to the Farmers of the Future programme (FoF) and those not exposed

The rating scales for pupils involved in FoF programme and those not involved, indicating their perceptions towards natural resources management were used to analyse this hypothesis. The results are summarised in Table 8.

From Table 8, the significance level of 0.001 is lower than the set alpha level of 0.05. This implies that the difference in the perceptions means between the two groups of pupils is statistically significant. The hypothesis that there is no significant difference in perceptions towards natural resources management between primary school pupils exposed to FoF programme and those not exposed was therefore, rejected. The findings suggests that primary school pupils who are exposed to the Farmers of the Future programme are more likely to have better perceptions towards natural resources management than those who are not exposed to the FoF programme.

The results in this study indicated that learners who were involved in the FoF programme scored better in perceptions towards practical and sustainable agriculture. These findings support the argument by Digolo (1986). He suggests that there is a need for institutions to use locally available resources for better understanding and appreciation of social and physical environment of a learner. The results in Table 8 imply that the Farmers of the Future initiative by World Agroforestry Centre may have influenced primary schools pupils' opinions, feelings and judgement of the importance and usefulness of the natural resources management.

Table 8. T-test on perceptions towards natural resources management of primary school pupils involved (participate) in FoF and those not exposed

Participation in FoF	N	Mean	Std. Dev.	t-value	df	P-value
No	59	3.7266	0.6112	4.904	115	0.001
Yes	58	4.1943	0.3957			

Significant at .05 level

4.4 Secondary School Pupils' Perceptions towards Natural Resources Management

Objective three of the study was to describe and compare the perceptions of secondary school students exposed to FoF and those not exposed, towards natural resources management. The data for this objective were gathered from secondary school students using a questionnaire. Some statements were negatively stated while others were positively stated.

4.4.1 Scoring of items in the questionnaire

The scoring procedure and analysis that was adopted in objective three was similar to the one used in analysis of the data in objective two. 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. On the other hand, the positive statements were scored as follows: "SD" carried 1 point, "D" 2 points, "U" 3 points, "A" 4 points and "SA" carried the maximum of 5 points. Sorting out of the positive and negative items in the questionnaire was done manually before coding of the data for analysis.

The items that were stated positively in this questionnaire were:

- Herbicides should be banned in weed control

  SD D U A SA
- Education is the world's single most powerful weapon against poverty.

  SD D U A SA
- The present education curriculum in Kenya has minimal focus on skills for life and sustainable development.

  SD D U A SA
- I prefer learning by doing in agriculture

  SD D U A SA
- Community members around the school should be involved in club activities like tree planting together with the students.

  SD D U A SA
- The government should use extra money to train teachers on environmental conservation methods.

  SD D U A SA

- I believe soil erosion can be controlled effectively by planting more trees.

  SD D U A SA

- A new subject called "Environmental conservation" should be introduced in secondary schools.

  SD D U A SA

- Farmers' cultivating on the river valley should be discouraged from doing so.

  SD D U A SA

- I am likely to become a successful environmental conservationist.

  SD D U A SA

The remaining twelve statements in the questionnaire were stated negatively. Descriptive statistics for objective three are provided in Tables 9 and 10. From Table 8, the secondary school students who were exposed to FoF programme indicated positive perceptions over those not exposed to the programme. 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 scores in individual items particularly 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 9. 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 on perceptions towards natural resources management that 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
9. Government should use extra money to train teachers on environmental conservation	Non participants	3.88	0.99
	Participants	4.08	1.05
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

Table 9.(contd)

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 clothes 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

Table 10 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 participated (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 practical situations among learners in their faming environment. The research therefore, indicated that the FoF programme has potential of enhancing sustainable agriculture among the young people who are the future farmers.

Table 10. 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

4.4.2 Hypothesis two: There is no significant difference in perceptions towards natural resources management between secondary school students exposed to the Farmers of the Future programme and those not exposed

Hypothesis two of the study sought to examine the difference in perceptions towards natural resources management between secondary school students exposed to Farmers of the Future programme and those not exposed. The Farmers of the Future programme by World Agroforestry Centre is currently involved in environmental management and agroforestry activities in both primary and secondary schools in the western region of Kenya. This study therefore, saw it better to analyse the response of primary school pupils and secondary school students separately. The null hypothesis (Ho_2) was therefore, intended to compare the means of secondary school students involved in FoF programme and those not involved. The null hypothesis was to ascertain whether the difference in perceptions means was statistically significant. The results from Table 11 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 significance level, is less than the fixed alpha level of 0.05.

The null hypothesis (Ho_2) was therefore, rejected. The students who were involved in FoF programme had a mean value of 4.3194 while those not exposed had a value of 4.0593. 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.

Table 11. 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
No	58	4.0593	0.3409	3.231	94	0.002
Yes	38	4.3194	0.4459			

Significant at .05 level

4.5 Perceptions towards Natural Resources Management by Gender among Primary School Pupils Exposed to the Farmers of the Future Programme

Objective four of the study sought to describe and compare perceptions of pupils involved in FoF programme towards natural resources management. Pupils were categorised into two groups, boys and girls. Data for this objective were obtained from primary school pupils using a questionnaire. It is the same questionnaire that provided the data in the analysis of objective two. Data in this objective were analysed descriptively by mean and standard deviation. Respondents were drawn from schools that were participating in FoF programme.

Gender is the meaning that a society attaches to being female or male, that is feelings, thoughts, and behaviour that are defined as feminine or masculine (Macionis, 1991). Gender differences are not evident among infants although over a lifetime the social worlds of males and females are distinguished in many ways (Turner, 1986). It is on this premise that the study investigated whether there was any gender difference in perceptions towards natural resources management among learners who were exposed to Farmers of the Future programme.

The results of this study indicated that there was no difference in perceptions towards natural resources management by gender among primary school pupils exposed to FoF initiative. The findings are consistent with Amudavi (1993) who found that there is no gender difference in the attitude and perceptions towards farming innovations hence adoption of the agricultural technologies. These findings may be supported by the fact that there is no bias by gender in the approach adopted by FoF initiative in its school activities.

Table 12 presents a comparison of primary school boys' and girls' perceptions towards natural resources management by mean and standard deviation. A perceptions index of the overall mean and standard deviation in each gender category is shown.
The overall mean of boys was 4.2117 while that of girls was 4.1556 and the standard deviation was 0.4005 for boys and 0.3934 for girls. The two means are quite close, implying that there might not be a significant difference in perceptions towards natural resources management between boys and girls who are involved in FoF programme. This may be attributed to the fact that both boys and girls are involved indiscriminately in FoF initiative.

Table 12. Perceptions index of primary school pupils towards natural resources management by gender among those exposed to FoF programme

Gender	Overall mean	Overall SD
Boys	4.2117	0.4005
Girls	4.1556	0.3934

4.5.1 Hypothesis three: There is no significant difference in perceptions towards natural resources management by gender among primary school pupils who are exposed to Farmers of the Future programme

The hypothesis of the study examined the difference in perceptions towards natural resources management by gender among primary school pupils who are exposed to the Farmers of the Future programme. From the data collected, the mean ratings were calculated.

Primary school pupils who are involved in FoF programme were grouped into two categories according to their gender.

Rubin (1985) indicated that although the differences between the sexes may be relatively small, they are still worth serious attention. This study also sought to discover whether there was a significant gender difference in perceptions towards natural resources management among primary school pupils who are involved in FoF programme. The t-test outputs shown in Table 13 indicate insignificant difference in means between boys and girls.

From Table 13 the significant level of 0.622 P-value is more than the set alpha of 0.05. The mean difference in perceptions between boys and girls who are exposed to FoF was therefore, not statistically significant. This could be due to the fact that the FoF initiative put emphasis on cooperation between boys and girls and uses instructional methods that are preferred by both boys and girls in school. This study therefore failed, to reject the null hypothesis that there is no significant gender difference in perceptions towards natural resources management among primary school pupils who are exposed to Farmers of the Future programme.

Table 13. T-test on perceptions towards natural resources management by gender among primary school pupils exposed (participants) to FoF programme

Gender	N	Mean	Std. Dev.	t-value	df	P-value
Boys	40	4.2117	0.4005	0.496	56	0.622
Girls	18	4.1556	0.3934			

Significant at .05 level

4.6 Perceptions towards Natural Resources Management by Gender among Secondary School Students exposed to the Farmers of the Future Programme

Objective five 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. The findings of the study indicated that there was no gender difference in perceptions towards natural resources management among secondary school students involved in FoF programme. These findings add a new dimension to the results reported by the Kenya National Examinations Council (KNEC, 2001) which indicate the average mean score of boys being higher than that of girls in secondary school agriculture subject (KNEC, 2001). 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 14 where comparison of secondary school boys' and girls' perceptions towards natural resources management by means and standard deviation are shown. 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 14.

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 in similar perceptions towards natural resources management as indicated in this study.

Table 14. Perceptions index of secondary school students towards natural resources management by gender among those exposed to FoF programme

Gender	Overall mean	Overall SD
Boys	4.4227	0.7048
Girls	4.2825	0.3186

4.6.1 Hypothesis four: There is no significant difference in perceptions towards natural resources management by gender among secondary school students who are exposed to the Farmers of the Future programme

The null hypothesis of the study stated that there is no 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 why there are sex differences in abilities and achievements (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.

From Table 15, 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 findings of the study therefore, failed to reject the null hypothesis that there is no significant gender difference in perceptions towards natural resources management among secondary school students who are exposed to the Farmers of the Future programme.
Table 15 has provided the results of the analysis of the data.

Table 15. 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	10	4.4227	0.7048	0.851	36	0.401
Female	28	4.2825	0.3186			

Significant at .05 level

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

In this fifth chapter of the study, a summary is presented, conclusions drawn from the findings and recommendations made based on the conclusions.

5.2 Summary

The Farmers of the Future (FoF) initiative is an international programme covering a number of countries such as Kenya, Uganda, Tanzania, Malawi, Zimbabwe, Mali, Philippines and Thailand. The initiative is involved in the integration of agroforestry and natural resources management into the school curriculum. FoF programme was conceptualised by the World Agroforestry Centre in the year 2000 in Kenya. But a working programme was officially launched in year 2002 in the western region of Kenya. The schools that are involved have formed a network called Lake Victoria schools agroforestry and environmental education network.

The problem that was investigated by this study was to determine the effects of FoF programme on primary and secondary school learners' perceptions towards natural resources management and also to document empirical data on the activities of FoF in the western region of Kenya. FoF initiative is quite recent in Kenya and the literature regarding the activities and effects of the programme in the region is inadequate.

The purpose of the study was to ascertain the effects of the FoF programme on the perceptions of the learners towards natural resources management. Comparison of perceptions of boys and girls was also determined amongst learners who are involved in the programme. The most common activities of the programme on the site were also documented and recommendations for improvement of the programme were made based on the findings of the study.

The study employed an ex-post-facto design. The target population was primary school pupils in classes 6, 7 and 8 and secondary school students, all of whom were members of agriculture or environment related clubs. One patron in each school was also involved.

Six primary schools and six secondary schools were involved in the study. Three schools in each category, primary or secondary, were selected from schools involved in FoF while the remaining were selected from schools that were not involved in FoF programme.

Clustered stratified sampling procedure was used to get the sample. There were two clusters of schools. One cluster was comprised of schools involved in FoF while the second one was made up of schools not involved in the FoF programme. There were two strata in each cluster. These were primary schools category and secondary schools category. Twenty respondents from each participating school were randomly selected. This summed up to 240 respondents. 12 patron teachers were also involved to give extra information about the activities of their clubs.

Questionnaires were used to collect the data. Primary school pupils had their set of questionnaires and secondary school students had a different set. Both sets, primary schools' and secondary schools' questionnaires, solicited information related to perceptions towards natural resources management. Learners and patrons from schools involved in FoF programme also provided information on activities of FoF in their respective schools.
Data were analysed using descriptive statistics as well as inferential statistics.

5.2.1 Summary of the major findings of the study

- **Activities of the Farmers of the Future programme in Kenyan schools**

The information that follows is related to objective one of the study. The study revealed that FoF programme in the western region of Kenya is involved in several activities in primary and secondary schools. The activities that were common in the schools were:

- Tree nursery management
- Tree planting
- Collection of seeds of trees
- Planting of cover crops
- Soil conservation measures on sloping areas
- Livestock rearing in some schools
- Growing of vegetable crops
- Schools feeding programme in some schools
- Poems and drama on agroforestry and environmental management by learners.

The activities are well integrated in the schools that are within the FoF network. Certain activities such as livestock rearing and feeding programmes in schools are limited to few schools due to their high initial capital investment. These activities were however, well managed in the schools where they were undertaken.

- **Perceptions of primary school learners towards natural resources management**

Objective two of the study was to describe and compare the primary school pupils exposed to FoF activities and those not exposed in their perceptions towards natural resources management. The perceptions of primary school learners towards natural resources management varied significantly depending on whether they were 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. The overall mean scores of primary school pupils' perceptions towards natural resources management were 4.1943 and 3.7266 for those involved in FoF programme and those not involved respectively. This is a statistically significant difference. It can therefore, be concluded that FoF programme instills better perceptions towards natural resources management in primary school pupils.

- **Perceptions of secondary school learners towards natural resources management**

Objective three of the study was to describe and compare the secondary school learners exposed to FoF activities and those not exposed in their perceptions towards natural resources management.

. Secondary school students who were involved in the FoF programme indicated better perceptions towards natural resources management compared to those not involved. Descriptive analysis of their responses on a five point Likert scale gave the means as 4.3194 and 4.0593 for those exposed to FoF programme and those not exposed respectively. The difference in perceptions was statistically significant indicating that

FoF programme by the World Agroforestry Centre had a significant impact on learners' perceptions towards natural resources management.

- **Perceptions of primary school pupils towards natural resources management by gender among those involved in FoF programme**

Objective 4 was seeking information on the perceptions towards natural resources management among boys and girls in primary schools that were involved in FoF programme. Comparison between boys and girls was made to ascertain whether there was a 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. This may be attributed to the fact that FoF initiative ensures that there is no gender bias in its activities.

- **Perceptions of secondary school students towards natural resources management by gender among those involved in FoF programme**

Objective 5 compared the perceptions of boys and girls in secondary schools who are involved in FoF programme. The results of the study indicated that there was no significant difference in their perceptions towards natural resources management. The results in objective 5 could be attributed to the fact that FoF initiative is involved in activities that are relevant and acceptable to learners across the gender line.

5.3 Conclusions

Based on the findings of the study, a number of conclusions were drawn.

- The Farmers of the Future initiative has contributed significantly to the integration of natural resources management into the school curriculum in the schools where the programme is ongoing. This is evident in the activities that the programme has initiated in schools in the western region of the country.

- The Farmers of the Future initiative has significantly impacted on learners' perceptions towards natural resources management in primary and secondary schools. This was indicated by the better scores attained by learners who are involved in FoF

programme over those who are not involved in rating their perceptions towards natural resources management.

- There is gender parity in the involvement of learners in the FoF programme in Kenya schools. This is based on the fact that there was no statistically significant difference in perceptions towards natural resources management by gender among primary school pupils exposed to FoF programme. The same results were obtained in secondary school students who are involved in the FoF programme.

5.4 Recommendations

Based on the findings of the study, the researcher made the following recommendations that the World Agroforestry Centre through the Farmers of the Future programme may consider in future planning of the programme. Policy makers in education and environmental matters as well as curriculum developers in the education sector may find the recommendations important. Teachers as the implementers of school curriculum may also benefit from the recommendations given.

5.4.1 Recommendations for policy makers

- **The FoF programme should be expanded to cover more schools**

The World Agroforestry Centre should consider expanding the programme to cover more schools. This is supported by the fact that the learners involved in the programme in both primary and secondary schools indicated better perceptions towards natural resources management. This indicates that the learners in the FoF programme are more likely to conserve natural resources as farmers of the future.

- **The FoF training approaches that are gender sensitive should be maintained**

Since the learners in both primary and secondary schools that are involved in FoF programme indicated a similar level of perceptions towards natural resources management, it is recommended that the World Agroforestry Centre should maintain the same approaches that is using in integrating natural resources management into the schools' curricula through FoF initiative. The approaches are not gender biased according to the findings 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 in both primary schools and secondary schools.

5.4.2 Recommendations for further research

- **A comparative study should be carried out in a country where FoF programme has been going on for a long period of time.**

Such a study would give more information on the way the programme can achieve more in Kenya within a relatively shorter period of time. The findings of such a study will act as a reference point to avoid certain avoidable mistakes. Also it would give opportunity to compare the programme under different education systems.

- **A study should be conducted to determine the effects of learners' background on their attitudes towards agroforestry and natural resources management.**

Socio-cultural values often influence acceptance and practice of agricultural technologies among learners in developing countries (Ndegwa, 2004). School going children, who are the farmers of today and the new future, need to be well equipped with skills and positive attitudes in agroforestry and natural resources management for sustainable utilisation of the resources.

- **Studies on the socio-economic impact of the programme should be carried out.**

Studies should be conducted on the impact of the FoF programme among the older people (who own resources of land, crops and animals) in areas where the programme has been going on for some time. This would give empirical information on the expected future prospect of FoF programme in Kenya.

- **Attitudinal studies**

This study confined itself on perceptions because the FoF programme was quite new and the learners might have hardly developed attitudes as a result of involvement in FoF programme. It is therefore, recommended that attitudinal studies should be carried out after some time to ascertain effects of FoF on attitudes of out of school youths who were within the FoF programme when in school.

- **Resources requirements for expansion of FoF programme**

Studies should be carried out to determine resources requirements for further expansion of the programme.

- **Clubs participation in FoF approaches**

A study should be carried out to find out whether individual clubs that are in the FoF umbrella differ in employing FoF approaches.

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Appendix A

List of Schools Involved in FoF Programme

(Lake Victoria Schools Agroforestry and Environmental Education Network)

Vihiga district

Bunyore Girls

Hobunaka Sec

Igunga Girls

Mumboha Primary

Ebusakami Primary

Ebussamba Primary

Ekwanda Primary

Kisumu district

Maseno For The Deaf

Madeno Mixed Primary

Maseno Girls

Maseno National

Kisoyo Primary

Chula Imbo Primary

Ulalo Primary

Usivalu Primary

Agulu Primary

Ogada Primary

Joel Omino Primary

St Paul Kanya-Kwar

Bondo district

Lwak Girls

Bondo Primary

Maranda High

Siaya district

Bar Sauri

Kabura Boy Primary

Kabura Ulwan Primary

Ukwala Boys'

Sega Township

Mbaga Girls'

Mbaga Mixed

Kalkada Primary school

Appendix B

Questionnaire for Primary School Pupils

Name of your school _____ **Are you a boy or a girl?** _____

Your age (years) _____

Please read each statement carefully and then indicate the EXTENT to which you agree with each statement by circling the letters as shown in the example below.

Note: there is no any wrong answer

KEY

SD = Strongly Disagree

D = Disagree

U = Undecided

A = Agree

SA = Strongly Agree

Example. People should plant both hardwood and softwood trees

SD D U A SA

In this example, the pupil strongly agree with the statement

Do the same by circling the letters that best describe your level of agreement in the following statements

SECTION A:

1. Some large forests in Kenya should be cleared to settle the landless people

   SD D U A SA

2. I perform better in Kiswahili than in Agriculture.

   SD D U A SA

3. I like watching wild animals than listening to music.

   SD D U A SA

4. I find it difficult to do what the 4-K club patron tells us.

   SD D U A SA

5. I don't like agriculture.

   SD D U A SA

6. Our parents should do business instead of farming as much as possible.

   SD D U A SA

7. Teachers always force us to water the seedlings in the tree nursery.

   SD D U A SA

8. I feel comfortable with teachers who teach Kiswahili and English than those who teach us Science and Agriculture.

   SD D U A SA

9. Soil erosion will always take place even if people plant trees

   SD D U A SA

10. Cleaning cloths in the river makes people save time for other jobs.

    SD D U A SA

11. Planting and caring for the trees can be a hobby.

    SD D U A SA

12. A debate on athletics is more entertaining than of pollution.

    SD D U A SA

13. Cultivating next to the river can be very beneficial to farmers for a long period of time and therefore it should be encouraged.

    SD D U A SA

14. We always take some time in the tree nursery with our club patrons.

    SD D U A SA

15. I am likely to become a successful environmental conservationist.

    SD D U A SA

SECTION B:

1. a) Are you a member of Farmers of the Future (FoF) club in your school? Yes/No

   b) If yes in (1a) above what activities or work do you do in the club?

   _____

   _____

   _____

END. THANK YOU

Appendix C

Questionnaire for Secondary School Students.

Name of your school_____ **Gender**_____ **Your age** _____

Do NOT write your name.

Please read each statement carefully and then indicate by circling the EXTENT to which you agree with statement. Circle the letters that best describe your level of agreement.

Trust is placed on your honest supply of answers to the questions. All the information you will supply will be treated confidentially.

KEY

SD= Strongly Disagree

D= Disagree

U = Undecided

A= Agree

SA= Strongly Agree

SECTION A:

1. Inorganic fertilizers should be enhanced in farming than organic fertilizers since the farmer creates more employment.

   SD D U A SA

2. Herbicides should be banned in weed control

   SD D U A SA

3. Education is the world's single most powerful weapon against poverty.

   SD D U A SA

4. The present education curriculum in Kenya has minimal focus on skills for life and sustainable development.

   SD D U A SA

5. Participation of the under underprivileged and marginalized is enhanced in the present Kenya Education.

   SD D U A SA

6. I prefer learning by doing in Agriculture

   SD D U A SA

7. Involving students and teachers in the community work like making terraces should be discouraged.

   SD D U A SA

8. Community members around the school should be involved in club activities like tree planting together with the students.

   SD D U A SA

9. Government should use extra money to train teachers on environmental conservation methods.

   SD D U A SA

10. Much time is wasted on subjects like geography and agriculture while students learn things outside the classroom.

    SD D U A SA

11. I believe soil erosion can be controlled effectively by planting more trees.

    SD D U A SA

12. A new subject called "Environmental conservation" should be introduced in secondary schools.

    SD D U A SA

13. Farmers cultivation on the river valley should be discouraged from doing so.

    SD D U A SA

14. A debate on "pollution" is a waste of time at secondary school level.

    SD D U A SA

15. I am more comfortable with English and Kiswahili teachers than the Biology, Agriculture and Geography teachers.

    SD D U A SA

16. Cleaning cloths in the river should NOT be discouraged because it makes people save time.

    SD D U A SA

17. I find it difficult to plant and care for tree seedlings.

    SD D U A SA

18. Agriculture as a subject is not interesting.

    SD D U A SA

19. Some large forests in Kenya should be cleared to settle the land less people.

SD D U A SA

20. Agriculture practical lessons in school should be stopped.

SD D U A SA

21. I would like a career that does not require any farming activity.

SD D U A SA

22. I am likely to become a successful environmental conservationist.

SD D U A SA

SECTION B:

1. a) Are you a member of the Farmers of the Future (FoF) club in your school? Yes/No

b) If yes, list the activities you normally involve yourself in, in the club mentioned in 1(a).

END. THANK YOU

Appendix D:

Interview Schedule for Primary School Teachers

Name of the your school _____

Please read each statement carefully and supply the answers required. The information that you will supply will be treated with utmost confidentiality

1. List the clubs in your school that are active in agriculture and other environmental activities
   -
   -
   -
   -
2. List five main activities of each club you have named in item (1) above
   -
   -
   -
   -
   -
3. a) Is your school involved in the Farmers of the Future Programme by ICRAF? Yes/No
   b) If yes list the activities and the year that they were started in your school
4. Which of the following teaching methods would you actually consider to be the most appropriate for teaching agriculture in your school? Please indicate appropriateness of use by circling your rating (score)

	Most appropriate ←				→ Least appropriate
Visits/tours	5	4	3	2	1
Discussion	5	4	3	2	1
Supervised practice	5	4	3	2	1
Demonstration	5	4	3	2	1
Use of resource personnel	5	4	3	2	1
Projects (group or individual)	5	4	3	2	1
Lecture method	5	4	3	2	1

5. Among all the pupils in your class, about what fraction would you say are normally interested / active in agriculture practicals?

a) Over 75%
b) 50-75%
c) 25-50%
d) below 25%

6. How can you rate the amount of assistance that you give to your pupils during agricultural related practical activities?

a) More than 75%
b) Between 50-75%
c) Between 25-50 %
d) Less than 25%

7. Identify teaching media /resources that are always available for use in your school in teaching the following topics:-

Environment	Plants	Animals	Water	Soil	Energy	Climate	Resources and econ activities
i)							
ii)							
iii)							
iv)							
v)							

END: THANK YOU

Appendix E

Interview Schedule for Secondary School Teachers

Name of your school _____

Please read each statement carefully and supply the answers required. The information that you will supply will be treated with utmost confidentiality.

1. Name the clubs that are involved in agriculture and environmental activities in your school?

2. List five main learners activities of each club you have named in (1) above

3. a) Do the above club members interact with the community around the school in their activities? Yes/No

   b) If yes, how?

4. How would you rate clubs' activities in your school in matters relating to natural resources management?

   a) Over 75% b)25-50% c) 50-75% d) less than 25%

5. a) Is your school involved in the Farmers of the Future (FoF) programme by ICRAF? Yes/No

   b) If yes, list the activities and the time that they were started in your school.

6. a) If your school is involved in FoF programme, would you say that this has changed your teaching methods and the resources you use in teaching agriculture and /or biology? Yes /No

   b) If yes explain how?

END: THANK YOU.

Appendix F

Researchers Observation Schedule on the Activities of FoF

1. New activities initiated by FoF in the school
-
-
-
-

2. Observable limitations to the initiated activities in (1) above
-
    -
    -
    -

3. Possible solutions for the problems in (2) above
-
    -
    -
    -

4. Learners motivation towards FoF activities

    a) high b) moderate c) low

5. Teacher involvement in FoF activities

    a)High b)Moderate c)Low

6. General comparison between schools involved in FoF programme and those not involved in matters related to natural resource management.

Involved with FoF	**Not involved**
Primary schools	Primary schools
Secondary schools	Secondary schools

Appendix G

Comparison of the Perceptions towards Natural Resources Management by Means and Standard Deviations per item between Primary School Boys and Girls who are involved in FoF Programme

Statements on perceptions towards natural resources management that primary school pupils responded to	Gender	Mean	Std. Deviation
1. Large forests in Kenya should be cleared to settle the landless	Boy	4.53	.93
	Girl	4.44	.98
2. I perform better in Kiswahili than in agriculture	Boy	3.35	1.58
	Girl	3.06	1.92
3. I like watching wild animals than listening to music	Boy	3.98	1.49
	Girl	3.22	1.63
4. I find it difficult to do what the 4-k club patron tells us	Boy	4.38	1.17
	Girl	4.00	1.61
5. I don't like agriculture	Boy	4.72	.75
	Girl	4.33	1.14
6. Parents should do business instead of farming	Boy	4.33	.92
	Girl	4.56	.98
7. Teachers force us to water the seedlings in the tree nursery	Boy	4.40	1.15
	Girl	4.39	1.09
8. I feel comfortable with Kiswahili and English teachers that Science and agriculture teachers	Boy	4.13	1.14
	Girl	4.17	1.15
9. Soil erosion will always take place even if people plant trees	Boy	4.88	.33
	Girl	4.50	1.10
10. Cleaning cloths in the river makes people save time for other jobs	Boy	4.00	1.11
	Girl	4.00	1.19
11. Planting and caring for the trees can be a hobby	Boy	4.65	.92
	Girl	4.94	.24

12. Debate on athletics in more entertaining than of pollution	Boy	3.18	1.80
	Girl	3.11	1.88
13. Cultivation next to river can be very beneficial to farmers and should be encouraged	Boy	3.25	1.68
	Girl	4.33	.97
14. We always take some time in the tree nursery with our club patrons	Boy	4.53	.78
	Girl	4.44	1.20
15. I am likely to become a successful environmental conservationist	Boy	4.90	.30
	Girl	4.83	.38
Overall mean	**Boys**	**4.2117**	**0.4005**
	Girls	**4.1556**	**0.3934**

Appendix H

Comparison of the Perceptions towards Natural Resources Management by Means and Standard Deviations per item between Secondary School Boys and Girls who are involved in FoF Programme

Statements on perceptions towards natural resources management that secondary school students responded to	Gender	Mean	Std. Deviation
1. Enhance Inorganic fertilizers in farming	Boy	3.10	1.37
	Girl	3.18	1.59
2. Herbicides should be banned in weed control	Boy	2.60	1.51
	Girl	2.50	1.23
3. Education is powerful against poverty	Boy	3.90	1.37
	Girl	4.57	.69
4. Present education curriculum in Kenya has minimal focus	Boy	3.30	1.42
on skills for life and sustainable development	Girl	3.32	1.31
5. Participation of the underprivileged and marginalized is	Boy	3.40	1.17
enhanced in present curriculum	Girl	3.75	1.21
6. I Prefer learning by doing in agriculture	Boy	4.10	1.20
	Girl	4.61	.74
7. Involving students and teachers in community work	Boy	4.70	.48
should be discouraged	Girl	4.89	.31
8. Community members be involved in club activities	Boy	4.80	.42
	Girl	4.64	.68
9. Government should use extra money to train teachers on	Boy	4.30	.95
environmental conservation	Girl	4.00	1.09
10. Much time is wasted on subjects like geography and	Boy	4.60	.52
agriculture	Girl	4.75	.59

11. Soil erosion can be controlled effectively by planting more trees	Boy	4.40	.52
	Girl	4.68	.48
12. Environmental conservation as a main subject should be introduced in schools	Boy	4.40	.52
	Girl	4.32	.86
13. Farmers cultivating on the river banks should be discouraged	Boy	3.90	1.45
	Girl	3.79	1.69
14. Debate on pollution is a waste of time	Boy	4.70	.48
	Girl	4.71	.81
15. I am more comfortable with English and Kiswahili teachers than biology, agriculture and geography teachers	Boy	4.50	.71
	Girl	4.68	.72
16. Cleaning cloths in the river should NOT be discouraged because it saves time	Boy	4.70	.48
	Girl	4.68	.67
17. I find it difficult to plant and care for tree seedlings	Boy	4.10	.88
	Girl	3.93	1.21
18. Agriculture is not interesting	Boy	4.90	.32
	Girl	4.86	.59
19. Some large forests in Kenya should be cleared to settle the landless people	Boy	4.60	.97
	Girl	4.54	.69
20. Agriculture practical lessons in schools should be stopped	Boy	4.90	.32
	Girl	4.86	.36
21. I would prefer a career that does not require any farming activity	Boy	4.80	.42
	Girl	4.25	.97
22. I am likely to become a successful environmental conservationist	Boy	4.60	.52
	Girl	4.71	.53
Overall mean	**Male**	**4.4227**	**0.7048**
	Female	**4.2825**	**0.3186**

Telegrams: "EDUCATION", Nairobi
Telephone: Nairobi 334411
When replying please quote

Ref. No. .....
MOEST 13/001/35C 25/2
Date .....

JOGOO HOUSE "B"
HARAMBEE AVENUE
P.O. Box 30040-00100
NAIROBI

1st February, 2005 20.....

Michael Gachaga Kanyi
Egerton University
P.O. BOX 536
NJORO

Dear Sir

RE: RESEARCH AUTHORISATION

Please refer to your application for authority to conduct research on "Effects of Farmers of future on Learners perception towards Natural Resource Management" I am pleased to inform you that you have been authorised to conduct research in Kisumu, Bondo and Vihiga Districts for a period ending 28th March, 2005.

You are advised to report to the District Commissioners and the District Education Officers of the respective Districts of your research before embarking on your research project.

Upon completion of your research you are expected to submit two copies of your research findings to this Office.

Yours faithfully

B. O. ADEWA
FOR: PERMANENT SECRETARY

Cc
The District Commissioner
Kisumu
Bondo
Vihiga Districts

The District Education Officer
Kisumu
Bondo
Vihiga Districts