

**SOCIO - ECONOMIC DETERMINANTS OF GIRLS'
PERFORMANCE IN AGRICULTURE IN PUBLIC MIXED DAY SECONDARY
SCHOOLS OF KIRINYAGA CENTRAL SUB - COUNTY, KIRINYAGA
COUNTY, KENYA**

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**A Thesis Submitted to the Graduate School in Partial Fulfillment of the
Requirements for the Award of the Degree of Master of Science in Agricultural
Education of Egerton University**

EGERTON UNIVERSITY

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DECLARATION AND RECOMMENDATION

Declaration

This is my original work and has not been submitted for award of Degree in any university.

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DEDICATION

To my dear wife Loise, my son Vidic, my daughter Ednah, my mother Njoki, my father Muriithi and to all parents that strive to educate their children.

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ABSTRACT

For many of the world's people, agriculture is both a source of food and a means of livelihood. In Kenya, the agriculture sector has immense contribution to the economy in terms of providing food, employment and foreign exchange among other roles. Women make essential contributions to the country's agricultural and rural economy. Besides their daily routine consisting of cooking, cleaning, and other domestic chores, women are heavily involved in all aspects of the country's agricultural sector; from crop production to livestock rearing. Secondary school girls' performance in agriculture is therefore vital because it determines their future ability to engage in productive agricultural activities that would enhance food security and generate income for the family and the society at large. However, girls in Kirinyaga Central Sub - County's public mixed day secondary schools continue to perform poorly in the Kenya Certificate of Secondary Education (KCSE) agriculture examination. This study therefore aimed at investigating the extent to which parental factors, involvement in household chores, and school factors influenced girls' performance in agriculture in the sub - county's public mixed day secondary schools. Target population was from three girls taking agriculture and agriculture teachers in the public mixed day secondary schools in Kirinyaga Central Sub - County. Descriptive survey research design was used. Systematic random sampling technique was used to select girls for the study. Agriculture teachers were purposively sampled. Sample size included 20 teachers and 131 girls out of a population of 195 girls. Questionnaires and a standardized form three agriculture examination were used to collect data. A *t*-test and ANOVA at $\alpha = 0.05$ were used to analyze the data. Study findings indicated that parental factors (parents / guardians' education and parental support), girls' involvement in household chores and school factors (teachers' academic qualification, teachers' experience and agriculture facilities) had a statistically significant $p \leq 0.05$ influence on girls' KCSE performance in agriculture. The study concluded that parental factors, girls' involvement in household chores and school factors are all important determinants of girls' performance in agriculture. To improve girls' performance in agriculture, the study recommended: support by the parents, reduced household chores for girls, adequate facilities for teaching agriculture, and use of agriculture teachers with higher academic qualifications and experience.

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ABBREVIATIONS AND ACRONYMS

KCPE	Kenya Certificate of Primary Education
KCSE	Kenya Certificate of Secondary Education
KNEC	Kenya National Examinations Council
NCST	National Council for Science and Technology

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Education is vital for raising a generation of holistic individuals who are self-reliant with ability to accommodate divergent economic and social-cultural values of others in the society. According to Offorma (2009), education is a process through which the young acquires knowledge and realizes her potentialities and uses them for self-actualization, to be useful to her and others. Good quality education in terms of learning outcomes in literacy, numeracy and life skills can contribute to increased work productivity, higher individual income levels, economic and social growth, improvement in health, the generation of innovative ideas, and the rapid learning of new technology (Saito & Cappelle, 2009). Similarly, Nelson Mandela observed that education is the most powerful weapon a person can use to change the world (Sichone, 2011). It undoubtedly remains the bedrock of all facets of development and no child below the age of 18 years should be elsewhere but in a school pursuing education (Agwom, 2010).

Educating girls cannot be overemphasized. The old adage that if you educate a man, you educate an individual, but if you educate a woman, you educate the whole society makes a lot of sense. Children are the future leaders and mothers are the guardians of the future (Offorma, 2009). Therefore, educating girls who are mothers of tomorrow would enable the family and society at large to raise healthy and productive individuals who are physically, socially and mentally well developed. Addressing the United Nation's Fifty-Fifth Session of the Commission on the Status of Women in New York, Odinga (2011) asserted that women's active participation in education especially in science and technology would create more job opportunities. A girl without education becomes a woman vulnerable to the risks of unhealthy childbearing patterns, who is less empowered in decision making and with limited access to resources in both private and public spheres (Mowla, 2009). Education further empowers women to make informed decisions regarding the family planning method to adopt and the number of children to have.

Women engaged in professional careers or income generating activities can ill afford the opportunity cost of having many children (Kimani&Kombo, 2010). Indeed, according to Dawo and Simatwa (2010), girls' education reduces poverty, lower infant and maternal mortality and improves health, nutrition and environmental management.

Learning agriculture in secondary schools by girls is of enormous importance. This is partly because agriculture is an important engine of economic growth and poverty reduction (Dosset *al.*,2011). On the other hand, women are the backbone of the economy, comprising majority of small scale farmers in many developing countries (Verveer, 2011). Women make essential contributions to agricultural and rural economies in several countries (International Fund for Agricultural Development [IFAD], 2011). Besides their daily routine consisting of cooking, cleaning, and other domestic chores, women are heavily involved in all aspects of a country's agricultural sector; from crop production to livestock rearing (Jamali, 2009). Women continue to earn a substantial portion of the family income and continue to dominate food processing industries, and backyard livestock and vegetable production, besides taking their primary function as housekeepers and home makers (Satyavathi, Bharadwaji, &Brahmanand, 2010).

According to Verveer (2011) agriculture is central to economic growth when women learn the best way to grow and cultivate their own nutritious food which they can use to feed their children and sell excess produce in the markets. However, this is only possible when girls are provided with quality agriculture education. It is against this background that good performance of girls in secondary school agriculture is imperative. Unfortunately, girls in Kirinyaga Central Sub - County's public mixed day secondary schools continue to perform poorly in KCSE agriculture examination (KNEC, 2012). This could be partly because girls learning in public mixed day secondary schools are faced with many problems especially those from poor families (Hakijamii, 2009). Factors that have been blamed for girls' poor academic performance include student's involvement in household chores (Omenge&Nasongo, 2010), parent's education (Ajayi&Muriana, 2011), and parental support (George &Mensah, 2010), among others.

The school environment, which includes factors such as availability of textbooks, availability of teaching and learning facilities, and the class size could also influence student's academic performance (Juma, Simatwa&Ayedo, 2011; Lippman, 2010). Teachers' experience had also been shown to impact on students' learning outcomes (Rice, 2010). However, according to Lai, Sadoulet and Janvry (2009), the number of years of teaching have significantly negative effect on students' academic performance. Teachers' academic qualifications equally influence students' academic performance (Ariyo, 2011). Nevertheless, Asikhia (2010) found unclear influence of teachers' qualifications on students' academic performance.

Though with mixed results, studies also show that teacher's gender may influence student's academic performance (Beilock, Gunderson, Ramirez, & Levine, 2010; Carrel, Marianne, & James, 2010). Research work by Antecol, Eren and Ozbeklik (2012) on the effects of having a female teacher on mathematics test scores of pupils in primary school found, that among other things, female pupils who were assigned to a female teacher without a strong mathematics background suffered from lower mathematics test scores at the end of the academic year. However, upon investigating the effect of teachers' gender on pupils' academic performance in primary science in Nigeria, Folashade (2009) indicated that there existed no significant relationship between the performance of pupils taught by male and female teachers in primary science. Similarly, on their research to estimate whether there was a causal effect of having a same-sex teacher on students' learning outcomes in Germany, Neugebauer, Helbig and Landmann (2010) found that there was virtually no evidence of a benefit from having a same-sex teacher.

Based on the above background, this study was restricted to three factors: Parental factors (parent's education and parental support), involvement in household chores, and school factors (agricultural facilities, teacher's academic qualification and teacher's experience). Factors influencing agriculture performance have received little attention in literature. Little attention has also been given to the study of factors influencing agriculture performance of girls in public mixed day secondary schools. This study aimed at bridging this gap.

1.2 Statement of the Problem

Women play a key role in enhancing food security in Kenya since they form a large proportion of the country's small scale farmers. They also play a pivotal role in the generation of family income through their involvement in various agricultural activities. These agricultural activities are central in improving family livelihoods besides food provision. Therefore, girls, including those in public mixed day secondary schools require quality training in agriculture so as to achieve food security as per Kenya's vision 2030. However, many girls in Kirinyaga Central Sub - County's public mixed day secondary schools continue to perform poorly in KCSE agriculture examination. Their poor performance in the subject may in future translate to poor agricultural practices which may hinder the achievement of food security in the country. The influence of various social - economic factors on girls' performance in agriculture has not been clear. This study therefore sought to establish the socio - economic determinants of girls' performance in agriculture in Kirinyaga Central Sub - County's public mixed day secondary schools.

1.3 Purpose of the Study

The study sought to investigate the socio - economic determinants of girls' performance in agriculture in public mixed day secondary schools of Kirinyaga Central Sub - County. It examined the extent to which parental factors (parents' education and parental support), involvement in household chores and school factors (agriculture facilities, teachers' academic qualification and teachers' experience) influence girls' performance in agriculture.

1.4 Objectives of the Study

The study was guided by the following three objectives:

- (i) Assess the extent to which parental factors (parents/guardians' education and parental support) influence public mixed day secondary schools girls' performance in agriculture.
- (ii) Examine the extent to which involvement in household chores influence public mixed day secondary schools girls' performance in agriculture.
- (iii) Determine the extent to which school factors (agriculture facilities, teachers' academic qualifications and teachers' experience) influence public mixed day secondary schools girls' performance in agriculture.

1.5 Hypotheses

The study was guided by three null hypotheses as follows:

- Ho₁: Parental factors have no statistically significant influence on girls' performance in agriculture in Kirinyaga Central Sub -County's public mixed day secondary schools.
- Ho₂: Involvement in household chores has no statistically significant influence on girls' performance in agriculture in Kirinyaga Central Sub - County's public mixed day secondary schools.
- Ho₃: School factors have no statistically significant influence on girls' performance in agriculture in Kirinyaga Central Sub - County's public mixed day secondary schools.

1.6 Significance of the Study

Girls learning agriculture may use the results of the study to reflect on their performance in the subject and this reflection may help them to improve on it. Parents and the local community might use the results of the study to seek solutions to the problem of girls' poor performance in agriculture. Agriculture teachers and principals of public mixed day secondary schools in Kirinyaga Central sub - county may use the study findings to find ways of improving girls' performance in agriculture. The results of this study may also help to inform the government's policy regarding girls' agriculture education with the

aim of addressing the socio - economic challenges that girls studying agriculture in public mixed day secondary schools encounter.

1.7 Scope of the Study

The study was confined to selected socio - economic factors that were likely to greatly influence public mixed day secondary schools girls' performance in agriculture. The factors studied were: parental factors (parents/guardians' education and parental support), involvement in household chores, and school factors (agriculture facilities, teachers' academic qualification and teachers' experience).

1.8 Assumptions of the Study

The following assumptions were made during the study:

- i The respondents were cooperative and frank and therefore gave accurate information.
- ii The difference in social economic status of girls involved in the study was insignificant.
- iii A parent's gender has insignificant influence on a girl's academic performance.

1.9 Limitation of the Study

The researcher had no control over the school calendar and school events and hence pilot testing and data collection had to be carried out within the timelines allowed by managements of the participating schools

1.10 Definitions of Terms

Household Chores: Constitutively refers to the tasks done regularly in a home or house such as cooking, cleaning and taking care of the children (Macmillan English Dictionary for Advanced Learners; New Edition, 2007). Operationally, the term was used to refer to tasks such as caring for young ones, caring for the sick, collecting firewood, sweeping, preparing food, fetching water and washing clothes and utensils.

Parents' Education: The term means the standard of education reached by the parent (Macmillan English Dictionary for Advanced Learners; New Edition, 2007). It was used to refer to the education level attained by the parents; whether university (highest), college, secondary, standard eight or below standard eight (lowest).

Parental Factors: This term refers to those factors that are connected with a parent (Oxford Advanced Learner's Dictionary; New 8th Edition, 2010) that may influence girls' performance in agriculture subject. In this study, parental factors referred to parent's education and parental support.

Parental Support: The term refers to the help or encouragement given to children by their parents (Oxford Advanced Learner's Dictionary; New 8th Edition, 2010). In this study, it was used to refer to all aspects of care, love and providence provided to children by their parents.

Performance: The term refers to the standard to which someone does something such as an examination (Macmillan English Dictionary for Advanced Learners; New Edition, 2007). It was used to refer to the scores girls get in their agriculture examination.

School Facilities: This refers to buildings and equipment that are provided for the purpose of teaching and learning in a school (Oxford Advanced Learner's Dictionary; New 8th Edition, 2010). In the study, the term was used to refer to facilities for teaching and learning agriculture which included school farm, farm tools and equipment, farm machinery, text books and farm structures.

School Factors: This refers to those factors that are connected with a school (Oxford Advanced Learner's Dictionary; New 8th Edition, 2010) that may influence girls' performance in agriculture subject. The term was used with reference to school facilities, agriculture teachers' qualification and agriculture teachers' experience.

Socio-economic: The term refers to factors relating to, or involving a combination of social and economic aspects (Merriam Webster Online Dictionary). The term was used in this study to refer to the parental factors (parents' / guardians' education and parental support), involvement in household chores and school factors (agriculture facilities, teachers' academic qualifications and teachers' experience).

Teachers' Experience: The term refers to the knowledge and skill that a teacher has gained through teaching for a period of time (Oxford Advanced Learner's Dictionary; New 8th Edition, 2010). It was used in the study to refer to the number of years an agriculture teacher had taught agriculture.

Teachers' Qualification

This term refers to an examination that a teacher passed or a course of study that he or she successfully completed (Oxford Advanced Learner's Dictionary; New 8th Edition, 2010). In this study, the term was used to refer to the agriculture teachers' highest course of study only (academic qualification).

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In many countries of the world, agriculture plays an important role in the sphere of providing food and large scale employment to people. It is also important for providing raw materials for other industries besides being a major contributor in the Gross Domestic Product (GDP) of most countries. In Kenya, agriculture is considered to be the backbone of the economy; employing majority of the rural people and providing food to both rural and urban dwellers. Agriculture would appraise Kenya's development standards if its farmers are well trained. It is because of its vital role in the growth of the country's economy that agriculture is included in the secondary school curriculum. However, Kirinyaga Central sub - county's public mixed day secondary schools girls' performance in KCSE agriculture is poor. This section briefly summarizes literature relevant to the factors that may influence girls' performance in agriculture. Factors discussed under this section are parental factors (parent's education and parental support), involvement in household chores, and school factors (school facilities, teacher's academic qualification and teacher's experience).

2.2 Parental Factors

Several parental factors have been found to influence girls' performance in any academic work. These include parent's income, occupation, family structure, parent's education level, parental support and age of mother at the time of giving birth (Geckova, Tavel, Dijk, Thomas, &Reijneveld, 2010). Factors of interest in this study are the parent's education level and parental support.

2.2.1 Parents' Education Level

Parents' educational background would influence the academic performance of students in several ways. According to Ajayi and Muriana (2011), a child that comes from an educated family would like to follow in its steps and thus work hard in his or her studies. Such students end up being better performers at school (Garikai, 2010). Educated parents tend to participate in the school's education process and encourage their children to learn. On the same note, high level of education, which most often goes with high occupational status, means that the parent will be able to meet the child's basic needs and this may boost the child's academic performance (Muola, 2010). According to Muola, parental involvement which could be lacking in parents whose education level is low, may have a motivating effect on the child thus making him or her perform better academically.

According to Glick, Randrianarisoa and Sahn (2008), parental schooling enhances academic performance of students. For example, educated parents tend to have higher educational expectations in their children, which in turn have a strong influence on the children's own goals for post secondary education (Child Trends, 2010). Not surprisingly, more highly educated parents actively encourage their children to develop high academic expectations of their own (Dubow, Boxer, & Huesmann, 2009). Besides, Chevalier, Harmon, O'sullivan and Walker (2010) found that more educated parents provide a better home environment for their children, which in turn has a positive impact on the student's academic performance. Further, this literature is supported by Nuthana (2007) who assert that the type of intellectual environment in the home will definitely have an impact on the child's academic performance and this intellectual environment is determined by the parent's education level, among other factors. The child from an educated family has a lot of support such as decent and good environment for academic work, enough textual and academic materials and decent feeding (Akisanya, Ajayi, & Salomi, 2011).

Some literature shows that the influence of father's and mother's education level on their children could be different. This is supported by N. Ali, Jusoff, S. Ali,

Mokhtar and Salamat, (2009) whose studies found that there is significant gradient between each parent's education level and their child's educational attainment. According to them, relative to a parent with no qualifications, mother's education has a stronger association with her child's educational attainments than the education of the father. In their study carried out in Pakistan to determine the factors affecting students' performance in private colleges, Hijazi and Naqvi (2006) had hypothesized that the relationship between the dependent variable and student's mother's education level were positively related. This relationship relation was accepted by a coefficient value of 0.392 and a positive highly significant *t*-value of 2.315. Moreover Glick *et al.*, (2008) found that schooling of the mother matters far more for learning than schooling of fathers, perhaps reflecting the differences in parental time spent with children on school work.

The findings in the above literature are strengthened by results of research work done by Raychaudhuri, Debnath, Sen and Majumder (2010). In their research it was assumed that mother's education was positively related to the academic performance of the student. According to them, an educated mother could take better care for her child leading to better academic performance. The result of their study showing a coefficient value of 0.170 and a positive significant *t*-value of 3.051 confirmed this relation. Indeed, while investigating the effect of mother's level of education on secondary grade science students in Pakistan, Faize and Dahar (2011) found that students whose mothers were educated performed better than students whose mothers were illiterate. However, as the level of mother's education rose, the difference in science students' score was not significant indicating a certain minimum level of mother's education required for better student's performance.

2.2.2 Parental Support

The road to a college degree does not begin the day a student first enters in a college campus, or even the first day of high school (Crosby, 2011). Rather, a student's journey to collegiate success begins the day they are signed up for pre-school or kindergarten. If this is the case, student's academic success is greatly affected by their family, particularly their parents; the individuals with whom they spend a great deal of time in the formative

years preceding primary school and extending through their high school and college studies, respectively. In their study to investigate the effects of motivation and parental influence on the educational attainments of students at secondary school level, Atta and Jamil (2012) found that children with close and caring parents who encourage them and who participate in their educational activities have better academic performance. Undoubtedly, the most accurate prediction of a student's achievement in school is not income or social status, but the extent to which that student's parent is able to create a home environment that encourage learning and to express high expectations for their children's achievement and future careers (Adewumi, Olojo, & Falemu, 2012). This finding is supported by Chekaraou and Goza (2013) who, in their study on Teachers Implementing an Educational Policy and Implications for Pupils' (Especially Girls) Access, Performance and Retention, asserted that parental involvement in their children's education is pivotal to the children's learning and is a better predictor of students success at school than income or social status.

Research by Hielat and Al-Shabatat (2012) to compare academically gifted and non-gifted students' supportive environments in Jordan found that support from parents, among other factors, give students opportunities to fully exploit their academic potential. According to Abdalla and Noori (2009), parental support leads to remarkable improvements in student's motivation towards class participation and in homework completion. Research shows that parental support makes an enormous impact on the student's attitude, attendance and academic performance (George, & Mensah, 2010). It promotes better cooperation between parents and school and allows parents and teachers to combine efforts to help the children succeed in school. According to Conway and Houtenville (2008), schools would need to increase per-pupil spending by more than about 90,000 Kenya Shillings in order to achieve the same results that are gained with parental support.

Emphasizing the importance of parental support, Opolot-Okurut and Oluka (2008) show that students, especially girls, need tender care, love and the provision of regular encouragement to perform well academically. Parental support is central to children's

self-esteem (Jovanovic, 2008). It is considered that low self-esteem contribute significantly to academic failure (Naderi, Abdullah, Aizan, Sharir, & Kumar, 2009). In addition, studies show that if parents have a more positive, supportive attitude and emphasize the value of education rather than focusing on completing an assignment or getting a higher grade, then the child's attitude and motivation would increase (Katz, Kaplan, & Buzukashvily, 2011) leading to higher academic performance. Higher academic performance would in turn increase the student's self esteem. In this research, it was expected that there would be a positive influence by parental support on girls' performance in agriculture in Kirinyaga Central sub - county of Kenya. However, the magnitude of this influence was not predicted.

2.3 Involvement in Household Chores

Among the main problems faced by girls in day secondary schools in Kenya are the many household chores they undertake at home (Jagero, Agak & Ayodo, 2010). Caring for young ones, caring for the sick, sweeping, preparing food, fetching water, collecting firewood and washing clothes and utensils are some of the household chores that students are engaged in at home (Omenga & Nasongo, 2010). According to Omenga and Nasongo (2010), involvement of students in household chores can affect their academic performance in end of term examinations and by extension the final examination. Household work means less potential study time and therefore students with household responsibilities may be at some disadvantage (Cockfield, 2006). In the research to explore the situation of female students' academic performance in Ethiopia, Dimbisso (2009) asserted that girls spend more time on household chores and other activities and this reduces their time and energy for studies.

A report by Hakijamii (2009) indicate that girls, especially in most poor families have to wake up very early to assist their siblings prepare for school while the parents go to work. Girls are also left to wash clothes, cook and clean the house after school, hence they do not get time to study or do their homework. Involvement of girls in household chores and its negative effect on their academic performance is also found in research

work by Juma *et al.* (2011). In their study on Gender Factor in Performance of Pupils in Kenya Certificate of Primary Education (K.C.P.E) examination, they assert that involvement in household chores such as fetching water, going to the market, grinding maize and taking care of children affect the academic performance of pupils, mainly girls. Oghuvbu (2008) further observes that female students are more involved in household chores and as a result many girls go to school late and thus their academic performance is affected.

Farther more, a study done in Tanzania to identify reasons for school dropout in community secondary schools revealed that students could drop out of school due to poor performance; which in turn is occasioned by irregular school and classroom attendance which is caused by, among other factors, involvement in household chores (Ntumwa&Rwambili, 2013).The detrimental effect of involvement in household chores on girls' performance in academic studies was also documented in research work done by Achoka, Nafula, and Oyoo (2013). In their study to investigate the negative cultural influence on secondary school girl - students' academic achievement in Bungoma County in Kenya, Achoka *et al.* (2013) established that girls feel they are given so much work to do which denies them opportunity for serious academic pursuit while at home. Chores that girls are involved in included cleaning the home, working on family farm or business, cooking and taking care of the young ones.

Similarly, upon investigating the effects of home environment on academic performance of married female distance learners in Ghana, Arko (2013) found that there was a significant negative relationship between commitment to household chores and academic performance. According to the study (Arko, 2013), learners who are always engaged with huge responsibilities may not have enough time for their studies and may therefore not perform creditably while those who spend less time on household chores may have enough time for their studies and therefore perform well.

2.4 School Factors

Several school factors have been found to influence agriculture performance of girls. These include school facilities for teaching agriculture, teachers' experience, teachers' academic and professional qualifications and teachers' gender. Factors of interest for this study were school facilities, teachers' experience and teachers' academic qualification.

2.4.1 Agriculture Facilities

According to Oghuvbu (2010), one of the problems affecting girls' performance in agriculture is poor and inadequate agriculture facilities in schools. Inadequate facilities among other school factors makes good teaching and learning impossible and thus they are partly to blame for students' poor academic performance (Ugborugbo&Akiri, 2009). This is supported by Dawo and Simatwa (2010) who, upon investigating the opportunities, challenges and coping strategies for head teachers in the promotion of secondary school girl - child education found, that among other things, inadequate facilities in schools was hampering girls' education. Similarly, Uwaifo (2008) observed that factors that are capable of influencing students' academic performance include adequacy of educational infrastructure like text books and well equipped laboratories.

Most of public schools underperform due to lack of laboratory facilities and overcrowding in classrooms among other factors such as lack of qualified teachers and text books (Hakijamii, 2009). In the study on School Facilities and Academic Achievement of Secondary School Agricultural Science in Ekiti State in Nigeria, Owoeye (2011) linked decline in students' academic achievement with non - availability of school facilities such as teaching materials, non - availability of classrooms, libraries and laboratories among others. Further research support that school facilities, including text books and supplementary reading materials influence the learning processes of the child and therefore lack of such facilities and materials can lead to students' poor academic performance (Chukwuemeka, 2013). According to Kagume (2010), lack of proper facilities is associated to poor funding of public schools.

2.4.2 Teachers' Experience

It has been firmly established that overall teacher quality is an important determinant of students' outcomes and that teachers differ strongly in their impact on student learning (Metzler & Woessmann, 2010). Teacher quality is therefore a key element in girls' success in agriculture. Teachers' experience enhances their knowledge, skills and productivity. According to Robinson (2010), there is a positive relationship between a teacher's experience and students' academic performance. However, the impact of experience is strongest during the first few years of teaching; after that, marginal returns diminish (Rice, 2010). Teachers therefore show their greatest productivity gains during their first few years on the job, after which their performance tends to level off. According to The New Teacher Project [TNTP] (2010), while it is essential to hold high expectation for all teachers from their earliest days in the classroom, it is unrealistic to expect even talented novice teachers to meet the same expectations as more experienced teachers. For this reason, expectations should increase steadily during a teacher's first three years in the classroom; the time when the greatest amount of improvement typically occurs (TNTP, 2010). Research work by M. Dahar, R. Dahar, T. Dahar, and Faize (2011) found that teaching experience has negatively insignificant relationship with students' academic achievement. However, other studies show that the number of years of teaching have significantly negative effect on students' academic performance (Lai *et al.*, 2009).

2.4.3 Teachers' Qualification

Researchers show teachers' qualification among other factors as a cause of poor academic performance (Ariyo, 2011). According to Lai *et al.* (2009), teachers' qualification in terms of education levels, that is, academic qualification is a strong positive predictor of students' academic performance. Further research shows that high school students learn more from teachers who hold bachelors or masters degree in the subjects they teach (Akinsolu, 2010). However, research by Asikhia (2010) showed unclear influence of teachers' qualification on students' academic performance; with one group of respondents having the opinion that teachers' qualifications influence students' poor performance while the other group did not think so. In addition, Dahar *et al.* (2011) found that professional qualification has insignificant relationship with academic

achievement of students. Research by Daley and Kim(2010)further showed that teachers' effectiveness is not well predicted by traditional qualifications such as advanced degrees.

2.5 Theoretical Framework

The study was informed by two theories: Bandura's social cognitive theory and the education production function theory. Bandura's social cognitive theory posits that people learn from one another, via observation, imitation and modeling (Bandura, 2006). It explains human behavior in terms of continuous reciprocal interaction between cognitive, behavioral and environmental influences (Cunningham, 2009). Behaviorism essentially states that one's environment causes one's behavior. In this respect, home environment in terms of parent's education level and parental support would influence the behavior of the girls in terms of effort towards academic tasks which would further impact positively on her performance in agriculture. A home environment where a girl is faced with several household chores would reduce the student's time spent on academic work thus impacting negatively on her effort and performance in agriculture. Based on environmental influence, the theory further suggests that educated parents are more likely to employ strategies that support their children's learning. Thus, girls' from a home environment where the parents are educated would receive necessary parental support and therefore perform better in agriculture. Similarly, a school environment having necessary facilities for teaching and learning agriculture and qualified and experienced agriculture teachers would help improve girls' performance in agriculture.

An education production function, on the other hand, is an application of the economic concept of a production function to the field of education. It relates to various inputs affecting students' learning, such as schools, families, peers and neighborhoods, to outputs including subsequent labour market success, college attendance, graduation rates and most frequently, standardized test scores. Education production function theory has its foundation on the United States' 1966 Coleman Report on Equality of Education Opportunity (Coleman *et al.*, 1966) which found that student's background and socio-economic status are much more important in determining educational outcomes than are

measured differences in school resources per pupil spending. Ideally, the environment both at home and school will either support girls' proper learning of agriculture or not. On the basis of this theory, parental factors, involvement in household chores, and school factors are important education production factors that could influence girls' performance in agriculture. It was expected that girls whose parents are educated and who offer them good support in their education would have better performance in agriculture than girls whose parents are illiterate and who offer them little or no support. Involvement in household chores is a factor that was expected to affect girls' performance in agriculture negatively. It was also expected that availability and adequacy of agricultural facilities and presence of experienced and qualified agriculture teachers would lead to better girls' performance in agriculture.

2.6 Conceptual Framework

The conceptual framework depicts the connections between parental factors, involvement in household chores, school factors and girls' performance in agriculture. Consistent with previous research by Ajayi and Muriana (2011), parents' education level would directly influence girls' performance in agriculture. Similarly, as supported by Abdalla and Noori (2009), parental support would also influence the girls' performance. Involvement in household chores would equally influence girls' performance in agriculture as supported by Hakijamii (2009) and Jumaet *al.* (2011) whose studies found that girls involved in household chores do not get time to study or do their homework. In addition, school factors such as teachers' experience would directly influence girls' performance in agriculture as shown by Robinson (2010) who found that there was a relationship between teachers' experience and students' academic performance. Intervening variables; girl's effort and girl's attitude towards agriculture could influence girls' performance. Girls' effort was controlled by providing similar conditions for revision prior to sitting for the standardized agriculture examination. In this regard, all the girls that were involved in the study were allowed equal time for revision for the standardized agriculture examination. To control for attitude towards agriculture, girls involved in the study were those who had chosen to study agriculture for their KCSE

examination. Hence, students that qualified to participate in the study were from three and four girls since they had done subject selection.

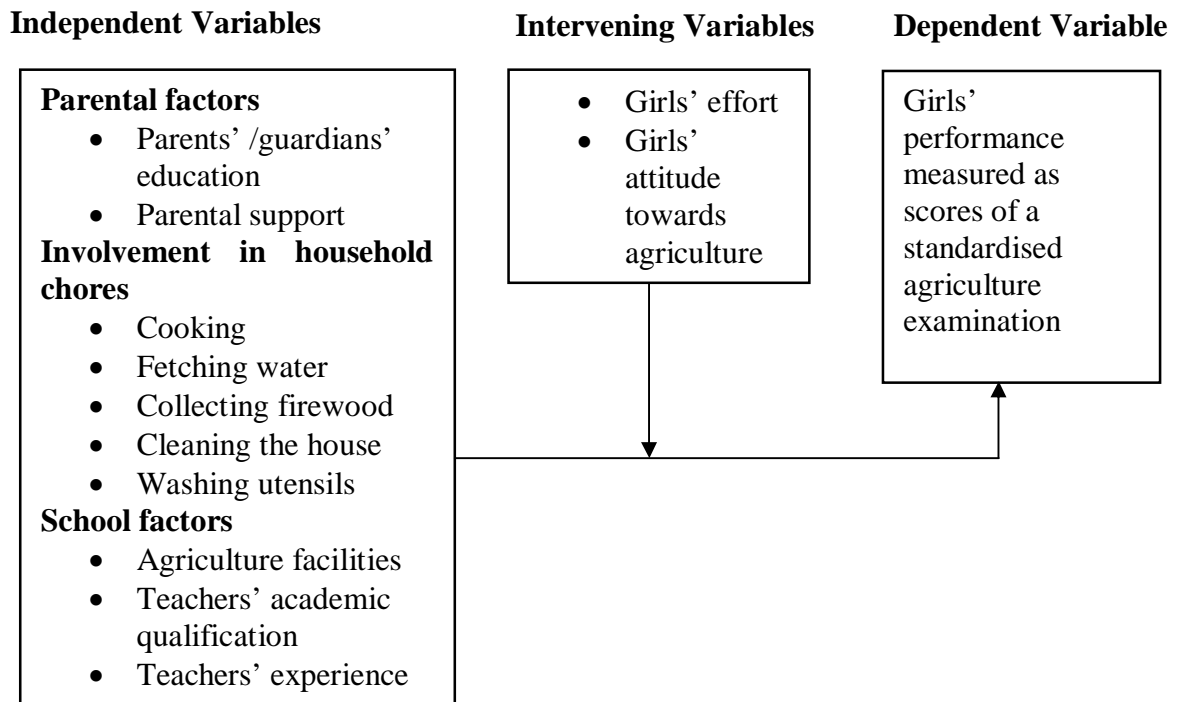


Figure 1: Relationship between Parental Factors, Household Chores, School Factors and Girls' Performance in Agriculture

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, the research methodology that was used in the study is described. It describes the research design, the geographical area where the study was conducted, population of the study and the sampling procedure and sample size. The instruments used to collect data, including methods to validate and estimate their reliability are described. The chapter also describes the data collection procedure and data analysis for the study.

3.2 Research Design

Descriptive survey design was used in this study. According to Shilubane (2009), a survey is used to collect original data for describing a population too large to observe directly. It obtains information about a particular issue from a sample of people by means of self-report, that is, the people respond to a series of questions posed by the investigator (Mugenda, 1999). This design was considered appropriate for the study because it provides an accurate account of the characteristics being studied. It therefore met the objectives of determining the extent to which parental factors, involvement in household chores and school factors influence girls' performance in agriculture in Kirinyaga Central sub - county's public mixed day secondary schools. Advantages of using the survey design also included the ability to accommodate a large sample size's generalizability of results, ease of administering questions and recording answers and increased capability of using advanced statistical analysis (The McGraw-Hill Companies, 2001).

3.3 Location of the Study

The study was carried out in all public mixed day secondary schools in Kirinyaga Central sub - county, Kirinyaga County. The large number of public mixed day secondary schools in the sub - county compared to other sub - counties in Kirinyaga County favored the study. Mixed small scale farming is the major economic activity in the sub - county. The sub - county has a tea zone in the north and a coffee zone in the south. It has its headquarters as Kutus town. Other important towns in the sub - county are Kagumo in the tea zone and Kerugoya in the coffee zone. The sub - county covers an area of 173.6 km² with a population of 113,355 persons; hence a population density of approximately 653 persons per square kilometre. The sub - county borders Mt. Kenya forest to the north and is well served by permanent water sources such as Thiba, Ciaminogia, Rundu and Rutui rivers; besides having several springs such as Kiwe and Kagumba. Other important features in the sub - county include Kamuruana hill, Kangaita tea factory and Mununga tea factory. The sub - county has relatively good road network connecting other towns with its headquarters, Kutus town. Important roads include Kutus - Kerugoya - Kagumo - Karatina and Kutus - Kagio-Sagana - Nairobi roads.

3.4 Population of the Study

The target population was form three and four girls taking agriculture and agriculture teachers in 20 public mixed day secondary schools. The accessible population, however, constituted 195 form three girls taking agriculture and 20 agriculture teachers. Appendix E shows the distribution of form three girls in each school. Form three girls were selected for the study because they had done subject selection. Form four girls taking agriculture were not involved in the study because they were busy preparing for their KCSE and thus were unavailable for the research process. Form one and two girls were not involved in the study since they had not done subject selection which is normally done before form two students graduate into form three class.

3.5 Sampling Procedures and Sample Size

Systematic random sampling was used to select the form three girls that participated in the study. In this method of sampling all the form three girls from the 20 public mixed day secondary schools were listed down to form the sampling frame using class lists. This listing formed the population of girls from which respondents were sampled. A total of 131 girls were selected for the study at a 0.05 margin of error; using the formula developed by Israel (2009) below:

$$n = \frac{N}{1 + N(e)^2}$$

Where n = Sample size
N = Population and
e = Margin of error

This formula was appropriate for determining the sample for the study because it gives a good sample size that lead to accurate results. A sample size obtained through the formula is neither too small leading to inaccurate results nor too large leading to wastage of time, resources and money. All the 20 agriculture teachers in the 20 public mixed day secondary schools were involved in the study.

3.6 Instrumentation

Data was collected using researcher - developed questionnaires and a standardized form three agriculture examination. The researcher developed a Five - Level Likert scale responses for the questionnaire items. There was a students' and a teachers' questionnaire. Students' questionnaire had two sections. Section A sought information on parental factors while section B sought information on girls' involvement in household chores. Section A of the students' questionnaire had 14 items; 2 items sought information on the demographic characteristics of girls' parents or guardians, 1 item on parents/guardians' education and 11 items sought information on parental support. Demographic characteristics of the respondents covered the type of parentage and the

general characteristics of the respondents' parents' / guardians' in terms of their occupational status. On the level of the parents' / guardians' of education, the girls were asked to state the highest level of education that their parents / guardians had attained. The responses were grouped into five categories, as follows: the ones whose education level was below standard eight, the group that only managed to complete standard eight or primary school, the category that had completed form four or secondary school level, the group that progressed beyond secondary school and obtained a college diploma and the group that obtained a university degree.

To help assess the level of parental support, the respondents were required to respond to eleven statements that formed the indicators of parental support. The eleven statements sought information on whether the parent / guardian guide her when faced with school related problems, provide her with personal effects, provide her with a conducive home environment for learning agriculture, is concerned about her score in agriculture tests, guide her in agriculture, go to school to discuss her studies with teachers, encourage her to work hard in agriculture, monitor her when doing studies at home, provide her with agriculture learning materials, emphasize to her the value of education, and, emphasize to her the need to pass well in agriculture.

Section B of the students' questionnaire had 5 items that sought information on girls' involvement in household chores. The variable involvement in household chores was operationalized by asking the respondents to rate four different statements used as indicators of the level involvement in household chores. In the four statements, the respondents were required to rate the extent of engagement in household chores before school, after school, during weekend, and, their perception on the extent to which they were engaged in household chores.

Teachers' questionnaire sought information on school factors. It had two sections, A and B. Section A had 3 items and sought information on teachers' gender, academic qualifications and teaching experience. The variable teacher academic qualification was assessed by asking the teachers to indicate the highest level of academic training they had

obtained; whether untrained (peer teacher), trained to diploma level or degree holder. Teachers' experience was operationalised as the number of years the teachers had been teaching agriculture in secondary schools. Teachers were asked to indicate the number of years they had spent teaching agriculture; whether below 3 years, 4 to 6, 7 to 9, 10 to 12, or 13 and above years.

Section B had 4 items that sought information on availability and adequacy of facilities for teaching and learning agriculture, that is, school farm or agriculture demonstration plots, farm tools and equipment, agriculture text books and farm structures. The variable agriculture facilities was operationalised by asking the respondents to indicate, on the Likert scale, the extent to which their school farm / demonstration plots, farm tools and equipment, agriculture text books, and, farm structures were adequate for teaching and learning agriculture.

3.6.1 Validity

Validity refers to the degree that an instrument actually measures what it is designed to measure (Burton & Mazerolle, 2011). Two types of validity were considered in this study, namely, face validity and content validity. Face validity is an evaluation of an instrument's appearance with the aim of establishing the instrument's ease of use and clarity while content validity is the evaluation of an instrument's representativeness of the topic to be studied (Burton & Mazerolle, 2011) so as to establish its credibility, accuracy, relevance, and breadth of knowledge regarding the domain. Face and content validity were established by a panel of experts from the department of agricultural education and extension who judged the instrument's appearance and representativeness of the topic studied (Netemeyer, Bearden, & Sharma, 2003; Turocy, 2002).

3.6.2 Reliability

Reliability refers to the consistency of a test or measurement (Burton & Mazerolle, 2011). It concerns the extent to which the instrument yields the same results on repeated trials. It was estimated by use of Cronbach's alpha reliability coefficient for Likert - type scales. According to Gliem and Gliem (2003) Cronbach's alpha is a test reliability technique that requires only a single test administration to provide a unique estimate of the reliability for a given test. It is an internal consistency index designed for use with tests containing items that have no right answer (Key, 1997); as was the case in this study. In addition, the instruments used in this study had multiple items, and as such, Cronbach's alpha internal consistency reliability could be calculated. A minimum of 0.7 Cronbach's alpha reliability coefficient was to be accepted for the study. Pilot testing the data collection instruments was done to enhance their reliability. According to Kathuri and Pals (1993), a sample of twenty five to fifty respondents is good for pilot testing. In this study, twenty five form three girls taking agriculture from Kabonge, one of the public mixed day secondary school in the neighboring Kirinyaga West Sub - County, were sampled for the pilot test. After pilot testing, the students' and teachers' questionnaires were found to have Cronbach's alpha reliability coefficients of 0.738 and 0.783 respectively.

3.7 Data Collection Procedures

Data collection commenced immediately the researcher obtained the University's approval. The researcher first sought a research permit from the National Council for Science and Technology to conduct research in public mixed day secondary schools in Kirinyaga Central Sub - County. He further sought permission from Kirinyaga Central sub - county's commissioner and education officer to conduct the research. Sampled schools were visited to inform the principals about the study and discuss the logistics of data collection. Both the students' and teachers' questionnaires were administered by the researcher. The respondents were given the questionnaires to complete after which the researcher collected them after one week. The standardized examination was set by a panel of three agriculture teachers. The panel constituted teachers who usually set Kirinyaga Central Sub - County Joint Agriculture Examinations. The examination was

administered by agriculture teachers in respective schools and marked by the same teachers who administered it; using a standard marking scheme. The examination, which took two hours, was done at the same time in all schools.

3.8 Data Analysis

Descriptive and inferential statistics were used to analyze the data at 95% confidence level ($\alpha = 0.05$) using the Statistical Package for Social Scientists. Descriptive statistics were used to describe data through means, frequency distributions and percentages. The inferential statistics used to test the influence of the independent variables on the dependent variable were the *t*-test and the analysis of variance (ANOVA). The *t*-test was used to examine the influence of agriculture facilities on girls' performance in agriculture. ANOVA was used to assess the influence of parents' education, parental support, involvement in household chores, teachers' experience and teachers' academic qualifications on the girls' performance.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents results on the influence of parental factors, involvement in household chores and school factors on girls' performance in agriculture subject in public mixed day secondary schools in Kirinyaga Central Sub - County. The chapter is divided into eight sections, which include: demographic characteristics of the respondents, parental factors (parents' / guardians' education and parental support), involvement in household chores, school factors (agriculture facilities, teachers' academic qualification and teachers' experience), girls' performance in agriculture, influence of parental factors on girls' performance in agriculture, influence of involvement in household chores on girls' performance in agriculture and influence of school factors on girls' performance in agriculture.

4.2 Demographic Characteristics of the Respondents

This section covers the type of the girls' parentage and the general characteristics of the respondents' parents / guardians in terms of their occupational status. The table 1 shows the frequency distribution of the respondents' type of parentage while Table 2 shows the frequency distribution of the parents' / guardians' occupation. The majority of the girls (87.8 %) came from families that had both parents / guardians. Girls who had the female parent / guardian only were 10.7 % while those who had a male parent / guardian only were 1.5 % of the total number of respondents. On the other hand, eleven different types of occupation were identified by the respondents. These included small scale farming, casual labour, business, carpentry, tailoring, driving, civil service, teaching, policing, nursing, and secretarial work. Three types of occupation formed the major ones out of the eleven identified; they were small-scale farming (48.7% for male parents / guardians and 45 % for female parents / guardians), casual laborer (17.9 % for male parents / guardians

and 28.7 % for female parents / guardians) and business (16.3 % for male parents / guardians and 20 % for female parents / guardians). These occupations were a reflection of the major activities undertaken by the people in the study area.

Table 1

Type of Parentage (n=131)

Type of Parentage Present	Frequency	Percent
Both Male and Female Parents/Guardians	115	87.8
Only Female Parent/Guardian	14	10.7
Only Male Parent/Guardian	2	1.5
Total	131	100.0

Table 2

Occupation of the Parents /Guardians (n = 131)

Occupation	Male Parent/Guardian		Female Parent/Guardian	
	F	(%)	F	(%)
Small-scale Farmer	57	48.7	58	45.0
Casual Labourer	21	17.9	37	28.7
Businessman / woman	19	16.3	26	20.0
Carpenter	7	5.9	0	0.0
Tailor	3	2.6	3	2.3
Driver	5	4.3	0	0.0
Civil Servant	2	1.7	2	1.6
Teacher	1	0.9	1	0.8
Police	2	1.7	0	0.0
Nurse	0	0.0	1	0.8
Secretary	0	0.0	1	0.8
Total	117	100.0	129	100.0

4.3 Parental Factors

This section covers results on parents' / guardians' level of education and parental support. The frequency distribution of the girl's responses on their parents/guardians' education level is given in Table 3. The results shown in Table 3 indicate that the proportion of girls whose parents / guardians had primary level of education and below formed 45.1 %. While about half of the respondents (46.6 %) indicated that their parents / guardians had attained the secondary school level of education, the results indicate that few of those parents were able to progress to tertiary institutions for diploma and degree studies. The results also showed that the higher the education of the parents / guardians, the higher the girls' mean marks. For instance, girls whose parents / guardians had diploma and bachelor degree levels of education obtained mean marks of 68 and above while girls whose parents / guardians had primary and below primary levels of education obtained mean marks of 37.2 and below.

Table 3

Distribution of the Education Levels of Parents/Guardians (n=131)

Level of Education	Frequency	Percent	Girls' Mean Marks
Below standard eight	20	15.3	19.5
Standard eight level (primary)	39	29.8	37.2
Secondary	61	46.6	55.8
Diploma	9	6.9	70.0
Degree	2	1.5	68.0
Total	131	100.0	

Parental support was the second parental factor considered to be an important socio - economic determinant of girls' performance in agriculture. The 11 indicators of parental support were rated by the respondents on a five point Likert scale (1 = strongly disagree indicating the lowest level of parental support, 2 = disagree, 3 = moderately agree, 4 = agree, and, 5 = strongly agree indicating the highest level of support by the parent). Table 4 shows how the 131 respondents rated each of the eleven indicators of parental support on the Likert scale. Results on table 4 show that a high percentage (83.2 %) of the

girls' rated provision of personal effects such as sanitary pads by their parents as being "very high". Relatively high (71.8 %) percentage of the girls also rated emphasis on the value of education by their parents / guardians as "very high". Half (49.6 %) of the girls involved in the study rated the provision of guidance by their parents / guardians on various problems they encounter in school as "very high". Slightly more than half (59.5 %) of the girls said that their parents / guardians "very highly" encouraged them to work hard in their studies. However, more than half (58 %) of the girls involved in the study rated the provision of agriculture learning materials by their parents / guardians as between "very low" and "moderate"

Table 4
Girls' Rating of Indicators of Parental Support

Parent Support Factors	Very Low (%)	Low (%)	Moderate (%)	High (%)	Very High (%)
Guidance on school problems	0.0	0.8	11.5	38.2	49.6
Provision of personal effects	0.0	0.0	9.2	7.6	83.2
Conducive home environment	3.1	3.1	12.2	35.9	45.8
Scores obtained in agriculture	3.1	9.9	14.5	36.6	35.9
Guidance in agriculture	7.6	22.9	9.9	24.4	35.1
Discussion with girls' teacher	8.4	23.7	22.9	27.5	17.6
Encouraged to work hard	0.0	3.1	3.8	33.6	59.5
Monitoring girls' studies at home	3.1	4.6	15.3	34.4	42.7
Agriculture learning materials	12.2	22.9	22.9	30.5	11.5
Emphasis on value of Education	0.0	0.8	1.5	26.0	71.8
Need to pass well in agriculture	0.0	7.6	9.9	42.7	39.7

n=131

The numbers on the Likert scale for the 11 items were added to obtain a scale ranging from 11 to 55 which was then put in categories that defined the four different levels of parental support. Table 5 shows the frequency distribution of the different levels of parental support. From the results shown in Table 5, 42 % of the respondents received low to moderate support from their parents / guardians while 58 % of the respondents received high to very high parental support. The mean marks of the respondents varied

with the different levels of parental support; with girls who received the “low support” scoring the lowest (24.3) mean marks in their agriculture examination while girls who received “very high support” from their parents / guardians scored the highest (62.0) marks in their agriculture examination.

Table 5
Distribution of Levels of Parental Support

Category	Level of support			Girls' Mean Marks
		Frequency	Percent	
11 – 21	Low	4	3.1	24.3
22 – 32	Moderate	51	38.9	45.1
33 – 43	High	74	56.5	47.6
Above 43	Very high	2	1.5	62.0
Total		131	100	

4.4 Involvement in Household Chores

The responses to the four statements used as indicators of involvement in household chores were rated on a five point Likert scale (1=strongly disagree indicating the lowest level of engagement, 2= disagree, 3= moderately agree, 4=agree, and 5= strongly agree indicating the highest level of involvement in household chores). The numbers on the Likert scale for the four items were added to obtain a scale ranging from 4 to 20 which was then put in categories that defined the five different levels of involvement in household chores. The Table 6 shows how the 131 respondents rated each of the four indicators of involvement in household chores while Table 7 shows the frequency distribution of the different levels of involvement in household chores as an aggregated variable. The results on Table 6 show that most of the girls (71.7 %) spent more time on household chores after school in the evening than before going to school in the morning (13.7 %). The results also show that almost half (45.8 %) of the girls felt that they spent a lot of their time (rated time spent on household chores “high” and “very high”) carrying out household chores; time which they would have spent reading. Such girls would not be expected to perform as well in agriculture as those (28.2 %) girls who felt

that they didn't spend as much of their time carrying out household chores (rated time spent on household chores "low" and "very low").

Table 6

Girls' Rating of the Indicators of Involvement in Household Chores

Girls Involvement in Household Chores	Very				Very
	Low	Low	Moderate	High	High
	(%)	(%)	(%)	(%)	(%)
Engagement Before school	79.4	3.8	3.1	1.5	12.2
Engagement After School	9.9	10.7	7.6	1.5	70.2
Engagement during Weekends	19.1	19.1	37.4	0	24.4
Time spent on Chores	7.6	20.6	26.0	20.6	25.2

n=131

From the results shown in Table 7, it is clear that more than half (57.2 %) of the respondents had "high" to "very high" level of involvement in household chores while only 16.1 % of them reported to have "very low" to "low" level of involvement. The results also show that the girls' mean marks varied with the level of involvement in household chores; with girls having "very low" level of involvement in household chores obtaining the highest mean marks (55) and girls having "very high" level of involvement in household chores obtaining the lowest mean marks (41.2).

Table 7

Distribution of the Levels of Involvement in Household Chores

Category	Level of Involvement	Frequency	Percent	Girls' Mean Marks
Below 6	Very Low	4	3.1	55.0
6 – 9	Low	17	13.0	54.5
10 – 13	Medium	35	26.7	49.6
14 – 17	High	51	38.9	42.5
Above 17	Very High	24	18.3	41.2
Total		131	100.0	

4.5 School Factors

This section covers results on school factors which include agriculture facilities, teachers' academic qualifications and teachers' experience.

4.5.1 Agriculture Facilities

Scores on the Likert scale for the four different agriculture facilities were added together to form a scale that ranged from 4 to 20 which was then divided into two categories; one that defined the agriculture facilities as of low adequacy (4 - 12) and the other that defined them as of high adequacy (13 - 20). The frequency distribution of the two categories is given in Table 8. From the results in Table 8, over half (58.8 %) of the schools in the study were found to be having low adequacy of agriculture facilities. This meant that the schools lacked adequate school farm / demonstration plots, farm tools and equipment, agriculture text books and farm structures; which are all important facilities for teaching and learning agriculture. The results show that there is a relationship between the level of adequacy of the facilities and the girls' mean marks in agriculture; with girls from schools with a high level of adequacy scoring higher mean marks (48.22) than girls from schools having low adequacy of the agriculture facilities (44.66).

Table 8

Distribution of the Level of Adequacy of Agriculture Facilities

Category	Level of Adequacy	Frequency	Percent	Girls' Mean
				Marks
4-12	Low adequacy	77	58.8	44.66
13-20	High adequacy	54	41.2	48.22
Total		131	100.0	

4.5.2 Teacher Qualification

In this study three levels of academic training were identified: untrained teacher with KCSE certificate only (commonly referred to as peer teachers), teachers trained to the diploma level, and, teachers trained to the degree level. The frequency distribution of the teachers' level of training in agriculture is given in Table 9. The majority of the teachers

(65 %) were found to be trained to the degree level, while 20 % of them were trained to the diploma level and the remaining 15 % were peer teachers having only a KCSE certificate. The results indicated that the teachers' level of academic training had an influence on the students' performance in agriculture. Girls taught by teachers that were educated up to the bachelor degree level were found to obtain a higher mean mark in agriculture (48.48) than girls that were taught by diploma holder teachers (37.16) and peer teachers (33.57)

Table 9

Distribution of the Teachers' Academic Qualification (n=20)

Level of Education	Frequency	Percent	Girls' Mean Marks
Peer teachers / KCSE	3	15	33.57
Diploma	4	20	37.16
Bachelor Degree	13	65	48.48
Total	20	100.0	

4.5.3 Agriculture Teachers' Experience

There were five categories of teachers' experience; below 3 years, 4 to 6 years, 7 to 9 years, 10 to 12 years, and 13 years and above. The teachers' experience frequency distribution is given in Table 10. The results on Table 10 indicate that majority of the agriculture teachers (85 %) in Kirinyaga Central Sub - County were experienced in teaching agriculture, having worked for more than 10 years. Only 1 teacher had worked for less than 3 years, 1 teacher for 4 to 6 years and another 1 teacher for 7 to 9 years. The results also showed that the girls' mean marks in agriculture were related to their teachers' experience in teaching the subject. For example, girls who scored the highest mean marks of 50.6 had teachers whose experience in teaching was the highest (13 years and above).

Table 10**Distribution of the Teachers' Experience (n=20)**

Category (Years)	Frequency	Percent	Girls' Mean Marks
Below 3	1	5	25.6
4to 6	1	5	33.5
7 to 9	1	5	42.3
10 to 12	7	35	43.1
13 and Above	10	50	50.6
Total	20	100.0	

4.6 Girls' Performance in Agriculture

The variable girls' performance in agriculture was measured as scores obtained by the girls in a standardised agriculture examination for form three. The two hour examination was administered as a mid - term assessment paper and was marked based on the standardised marking scheme. The maximum score for each girl in the standardised examination was 80 marks. The marks were in five categories and ranked as excellent (67 - 80 marks), very good (50 - 66 marks), good (34 - 49 marks), fair (17 - 33 marks) and poor (11 - 16 marks). The frequency distribution of the scores obtained by the girls in the examination is given in Table 11.

Table 11**Girls' Scores on the Standardised Examination**

Marks	Category	Frequency	Percent
0-16	Poor	9	6.9
17-33	Below Average	20	15.3
34-49	Average	44	33.6
50-66	Good	35	26.7
67 - 80	Very Good	23	17.6
Total		131	100.0

Mean 46.12, Std. dev. 17.31

The results on the girls' performance on the standardized agriculture examination showed that 44 girls (33.6 %) had average performance. This means that there could be certain factors hindering majority of the girls from having outstanding performance in agriculture. These factors could include the girls' involvement in household chores, lack of adequate parental support, inadequate agriculture facilities, low teacher qualification, and little teacher experience.

4.7 Influence of Parental Factors on Girls' Performance in Agriculture

The influence of parental factors on the girls' performance in agriculture was assessed by testing the first hypothesis of this study which was stated as "parental factors (parents' / guardians' education and parental support) have no statistically significant influence on girls' performance in agriculture in Kirinyaga Central Sub - County's public mixed day secondary schools".

4.7.1 Parents' / Guardians' Education

The 5 levels of parents' / guardians' education (Table 3) were tested to determine their influence on the performance of the girls in agriculture. The analysis of variance and the Tukey's HSD were used to test the mean differences of the 5 education levels of the parents/guardians influence on the girls' performance. The analysis of variance results showing the differences in the performance of the girls grouped by their parent's education level are given in Table 12 and the post-hoc test to show the group differences is given in Table 13. The ANOVA results show that differences in the performance of the girls existed by the parents / guardian groups that were based on the level of their education and these differences were statistically significant with a p - value of 0.00; ($p \leq 0.05$); Table 12. The education level of the parents / guardians therefore had a statistically significant influence on the girls' performance in agriculture.

Table 12**ANOVA of the Girls' Performance by the Education Level of the Parents (n=131)**

Source of Variance	Sum of Squares	df	Mean Square	F-value	p-value
Between Groups	27740.370	4	6935.092	77.643	0.000
Within Groups	11254.424	126	89.321		
Total	38994.794	130			

The mean marks for girls whose parents / guardians had attained the college and degree level of education were the highest; being 70 and 68 marks respectively (Table 13). Girls whose parents / guardians had below standard 8 education had the lowest mean marks.

Table 13**Multiple Range Test (Tukey's HSD Procedure) (n = 131)**

Parent / Guardian Education Level	Mean Marks	B8	PR	SE	Dip	DE
Below Standard 8 (B8)	19.5					*
Primary (PR)	37.2					*
Secondary (SE)	55.8					*
Diploma (Dip)	70.0					
Degree (DE)	68.0	*	*	*		

4.7.2 Parental Support

The 4 levels of parental support; low, moderate, high and very high (Table 5) were tested to determine their influence on the performance of the girls in agriculture. The analysis of variance and the Tukey's HSD were used to test the mean differences of the 4 levels of the parental support influence on the performance of the girls in agriculture. The ANOVA results showing the differences in the performance of the girls grouped by their parents / guardians' levels of support are given in Table 14 and the post-hoc test to determine the group differences is given in Table 15. The ANOVA results (Table 14) indicate that parental support had a statistically significant influence on the girls' performance at a p - value of 0.030; ($p \leq 0.05$).

Table 14**ANOVA of the Girls' Performance by the Levels of Parental Support (n=131)**

Source of Variance	Sum of Squares	Df	Mean Square	F-value	p-value
Between Groups	2636.722	3	878.907	3.070	0.030
Within Groups	36358.071	127	286.284		
Total	38994.794	130			

The results of the mean separation done using the Tukey's HSD (Table 15) show that the mean marks of the girls whose parents gave them a lot of support was higher (62.0 marks) than the mean marks of the girls whose parents gave them low support (24.3 marks) and this difference in mean marks was statistically significant at $p \leq 0.05$.

Table 15**Multiple Range Test (Tukey's HSD procedure) (n = 131)**

Level of Support		N	Mean Marks	VL	L	M	H	VH
Low	L	4	24.3					*
Moderate	M	51	45.1					*
High	H	74	47.6					
Very high	VH	2	62.0	*	*	*		

*means are significantly different at $p \leq 0.05$

Overall, parental factors (parents / guardians' education and parental support) were therefore found to have a statistically significant influence on girls' performance in agriculture in Kirinyaga Central Sub - County's public mixed day secondary schools and therefore the null hypothesis was rejected. Parents with a higher level of education had daughters who performed better in agriculture than parents who had low levels of education. The educated parents / guardians could generally be employed earning a salary and therefore able to meet the basic needs of their children (Muola, 2010). The same parents / guardians could also be able to provide their children with a good learning environment at home (Chevalier *et al.*, 2010), conditions that would enhance the higher performance.

Parental support, on the other hand, is therefore a strong predictor of girls' performance in agriculture. This is consistent with the findings by Atta and Jamil (2012) who, in their study to investigate the effects of motivation and parental influence on the educational attainments of students at secondary school level found that children with close and caring parents who would encourage them and participate in their educational activities have better academic performance. Girls therefore need parental support in terms of among other things, provision of basic needs and regular encouragement to pass well in agriculture as confirmed by the results of this study.

4.8 Influence of Household Chores on Girls' Performance in Agriculture

The influence of involvement in household chores on girls' performance in agriculture was tested against the second hypothesis of this study which was stated as "involvement in household chores has no statistically significant influence on girls' performance in agriculture in Kirinyaga Central Sub - County's public mixed day secondary schools". The different mean marks obtained by girls in each category of level of involvement in household chores (Table 7) were compared using ANOVA (Table 16). The results of the ANOVA shown in Table 16 indicated that involvement in household chores had a statistically significant influence on the girls' performance in agriculture at p - value of 0.029; ($p \leq 0.05$).

Table 16

ANOVA of Girls' Performance by the Levels of Involvement in Household Chores (n =131)

Source of variance	Sum of Squares	Df	Mean Square	F-value	p-value
Between Groups	3182.573	4	795.643	2.799	0.029
Within Groups	35812.221	126	284.224		
Total	38994.794	130			

The mean separation was done using the Tukey’s HSD and the results (Table 17) shows that the mean marks of the girls who had high involvement in household chores was lower (41.2 marks) compared to that of girls who had low involvement in household chores (55.0 marks). This difference in the mean marks was found to be statistically significant at $p \leq 0.05$.

Table 17

Multiple Range Test (Tukey’s HSD Procedure) (n = 131)

Level of involvement in household chores		Mean marks	VL	L	M	H	VH
Very low	VL	55.0					
Low	L	54.5					*
Medium	M	49.6					*
High	H	42.5					*
Very high	VH	41.2	*	*	*	*	

*means are significantly different at $p \leq 0.05$

The involvement in household chores by the girls was found to have a statistically significant influence on their performance in agriculture and therefore the null hypothesis was rejected. Varied household chores coupled with high frequency of engagement would affect girls’ performance in agriculture. Consistent with Juma *et al.* (2011), girls involved in the study were found to engage in household chores such as baby sitting, fetching water, collecting firewood, cleaning the house and washing utensils. As found by Dimbisso (2009) in the study carried out in Ethiopia, girls spend more time on household chores and this reduces their time and energy for studies. Many girls involved in the study reported that they were involved in household chores especially after school and over the weekend. Results of this study support the assertion by Omenge and Nasongo (2010) that girls’ involvement in household chores affect their agriculture performance in end term examinations and by extension their final agriculture paper.

4.9 Influence of School Factors on Girls' Performance in Agriculture

The influence of school factors on girls' performance in agriculture was tested against the third hypothesis which was stated as "School factors (agriculture facilities, teachers' academic qualifications and teachers' experience) have no statistically significant influence on girls' performance in agriculture in Kirinyaga Central Sub - County's public mixed day secondary schools".

4.9.1 Agriculture Facilities

Influence of agriculture facilities on girls' agriculture performance was tested using the *t*-test. The levels of adequacy, high and low (Table 8), of the agriculture facilities and the girls' mean marks in each level of adequacy were used to run the test. The results are presented in Table 18. The results (Table 18) of this study indicated that the schools that had a higher level of adequacy of agriculture facilities had their girls scoring higher mean marks (48.22 marks) compared to schools with a low level of adequacy of agriculture facilities (44.66 marks). The difference in mean marks between the two levels of adequacy in agriculture facilities was found to be statistically significant with a *p* - value 0.024; ($p \leq 0.05$).

Table 18

Mean Marks Comparison for Different Levels of Adequacy of Facilities (n = 131)

Level of Adequacy of Agriculture Facilities	N	Mean Marks	Std. Deviation	Std. Error Mean
Low adequacy	77	44.6623	17.47224	1.99115
High adequacy	54	48.2222	17.04120	2.31901
Total	131	46.12	17.31	

t - value= -1.160, df=129, *p*- value= 0.024

4.9.2 Teachers' Academic Qualifications

The mean marks the girls obtained in each level of teachers' academic training (Table 9) were compared using ANOVA. The results are presented in Table 19. Mean separation was done using Tukeys HSD and the results are given in Table 20. The results (Table 19) of the ANOVA indicated that the level of the teachers' academic training had a

statistically significant influence on the girls' performance in agriculture with a p - value of 0.005; ($p \leq 0.05$).

Table 19

Mean Marks Comparison for Different Levels of Teachers' Training (n = 131)

Source of Variance	Sum of Squares	Df	Mean Square	F-value	p-value
Between Groups	3136.117	2	1568.059	5.597	0.005
Within Groups	35858.677	128	280.146		
Total	38994.794	130			

The results of the mean separation done using the Tukey's HSD show that the mean marks of the girls who were taught by teachers who were trained up to the degree level was higher (48.48 marks) than that of the girls taught by the diploma teachers (37.16 marks) and also higher than that of the girls taught by the peer teachers (33.57 marks). The differences in these mean marks were found to be statistically significant at $p \leq 0.05$.

Table 20

Multiple Range Test (Tukey's HSD procedure) (n = 131)

Academic Level of the Teachers	N	Mean Marks	PT	DT	BD
Peer teachers / KCSE (PT)	20	33.57			*
Diploma Teacher (DT)	28	37.16			*
Bachelor Degree (BD)	83	48.48	*	*	
Total	131				

*means are significantly different at $p \leq 0.05$

4.9.3 Teachers' Experience

The mean marks the girls' obtained in each of the 5 different categories of teachers' experience (Table 10) were compared using ANOVA. The results are presented in Table 21 and the mean comparisons using Tukeys HSD are given in Table 22. The results of the ANOVA given in Table 21 indicated that teachers' experience had a statistically

significant influence on the girls' performance in agriculture with a p - value of 0.006; ($p \leq 0.05$).

Table 21

Mean Marks for Different Levels of Teachers' Experience (n = 131)

Source of Variance	Sum of Squares	df	Mean Square	F-value	p-value
Between Groups	4156.875	4	1039.219	3.759	0.006
Within Groups	34837.919	126	276.491		
Total	38994.794	130			

The results (Table 22) of the mean separation show that the mean marks of the girls who were taught by the teachers who had more than 13 years of experience was higher (50.6 marks) than that of the girls who were taught by teachers with lower experience. The differences in the mean marks obtained at the various levels of teachers' experience were found to be statistically significant at $p \leq 0.05$.

Table 22

Multiple Range Test (Tukey's HSD Procedure) (n = 131)

Teachers experience (years)	N	Mean Marks	Mean				
			1	2	3	4	5
Below 3	3	25.6					
4to 6	6	33.5					
7 to 9	10	42.3					
10 to 12	44	43.1					
13 and Above	68	50.6	*	*	*	*	
Total	131						

*means are significantly different at $p \leq 0.05$

From the above results, all the school factors studied were found to have a statistically significant influence on girls' performance in agriculture and therefore the third null hypothesis stating that school factors had no statistically significant influence on girls' performance in agriculture in Kirinyaga Central Sub - County's public mixed day

secondary schools was rejected. Girls in schools with adequate agriculture facilities would be expected to perform better in agriculture examination than girls in schools with inadequate agriculture facilities. The results of the study were consequently in agreement with the findings by Oghubu (2010) that one of the problems affecting girls' performance in agriculture is poor and inadequate agriculture facilities in schools. The results were also consistent with the findings by Ugborugbo and Akiri (2009) that inadequate facilities make good teaching and learning impossible. Adequate agriculture facilities such as the school farm or demonstration plots, farm tools and equipment, farm structures, livestock, text books and other agriculture resources would help turn otherwise theoretical agriculture lessons into demonstrations, practicals and projects that would go a long way in enhancing girls' knowledge and skills in agriculture and eventually improving their performance in agriculture.

Teachers' academic qualifications were also found to have a statistically significant influence on girls' performance in agriculture, concurring with the findings by Akinsolu (2010) that high school girls learn more from teachers who hold bachelors or master's degree in the subjects they teach. Possession of high academic qualification is important since it was found to positively influence girls' performance in agriculture, in that the highly qualified teachers have vast knowledge of the subject matter. However, these results were inconsistent with the research findings of Daley and Kim (2010) that teachers' effectiveness is not well predicted by traditional qualifications such as advanced degrees. Similarly, teaching experience of the agriculture teachers was found to be a significant determinant of girls' performance in agriculture. The results were consistent with the findings by Robinson (2010) that there is a positive relationship between a teacher's experience and students' academic performance. This is probably because teachers' experience is expected to enhance their knowledge, skills and productivity. Experienced teachers could also be more innovative and creative in their lesson delivery. The results of the study therefore support assertions by The New Teacher Project [TNTP] (2010) that, while it is essential to hold high expectation for all teachers from their earliest days in the classroom, it is unrealistic to expect even talented novice teachers to meet the same expectations as more experienced teachers.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter outlines a brief summary of the study, gives conclusions and recommendations resulting from the study. It also gives suggestions for further research to be conducted to discover more in terms of other variables that influence the performance of secondary school students taking agriculture.

5.2 Summary

The research problem addressed by this study was the poor performance in KCSE agriculture examination by girls in Kirinyaga Central Sub - County's public mixed day secondary schools over the past three years consecutively. The cause of this low performance was not well documented. This study therefore sought to document the socio-economic determinants of girls' performance in agriculture in public mixed day secondary schools of Kirinyaga Central Sub - County, Kirinyaga County, Kenya. Specifically the study investigated the extent to which parental factors (parents' education and parental support), involvement in household chores, and school factors (agriculture facilities, agriculture teachers' academic qualifications and agriculture teachers' experience) influence girls' performance in agriculture in Kirinyaga Central Sub - County's public mixed day secondary schools.

Descriptive survey design was used for the study. All the 20 Kirinyaga Central Sub - County's public mixed day secondary schools were involved in the study. Systematic random sampling was used to select the form three girls for the study. A total of 131 girls were sampled from a population of 195 girls who were taking agriculture. The formula developed by Israel (2009) was used to obtain the number of respondents at a 0.05 margin of error. The research instrument used to collect data included a students' questionnaire, teachers' questionnaire and a standardized form three agriculture paper.

The three hypotheses were tested using analysis of variance and *t* - test; using SPSS version 22 software.

Results of the study showed that parental factors (parents / guardians' education and parental support) had a statistically significant influence on the performance of the girls in agriculture. Girls whose parents' / guardians' level of education was low obtained lower marks in agriculture than girls whose parents' / guardians' education was high. Similarly, the involvement of the girls' in household chores was found to have a statistically significant influence on their performance in agriculture. Girls who were highly involved in household chores were found to have lower marks in agriculture than girls who were less involved in household chores.

School factors (agriculture facilities, teachers'academic qualifications and teachers' experience) were found to have a statistically significant influence on girls' performance in agriculture. The girls from schools that had more agriculture facilities were found to perform better in agriculture than girls from schools with fewer agriculture facilities. Similarly, girls whose teachers' had higher academic qualifications and more experience in teaching agriculture obtained higher marks in agriculture than girls whose teachers had lower academic qualification and less experience in teaching agriculture.

5.3 Conclusions

Based on the findings from this study, the following conclusions were made:

- (i) Girls whose parents / guardians had higher levels of education performed better in agriculture than girls whose parents / guardians had lower levels of education.
- (ii) Girls who received more parental support performed better in agriculture than girls who received little parental support.
- (iii) Girls who were more involved in household chores ended up performing poorer in agriculture than girls who were less involved in the chores.
- (iv) Girls whose teachers had higher academic qualifications performed better in agriculture than girls whose teachers had lower academic qualifications.

- (v) Girls taught by teachers who were experienced performed better in agriculture than girls taught by inexperienced teachers.
- (vi) Girls from schools having more adequate agriculture facilities performed better in agriculture than girls from schools with less adequate facilities.

5.4 Recommendations

Based on the above conclusions, the following recommendations are made:

- (i) Non - Governmental organizations (NGOs), churches, educationists, county governments and the elite in the society should organize forums where they educate the illiterate, the less educated, the less fortunate and the needy in the society on the value of education to their children and the society at large. They should also organize them into support groups where the value of education for their children is emphasized.
- (ii) Parents and guardians should be sensitized by other education stakeholders such as teachers, churches and education officers on the need to support their daughters by among other ways, providing them with a conducive learning environment at home, provision of personal effects, offering them regular encouragement, guiding and counseling them, visiting their schools to discuss their performance with teachers, and emphasizing the need for learning and passing well in agriculture.
- (iii) Parents and guardians should not overburden their daughters with household chores so that the girls spend more time doing studies while at home.
- (iv) The government should fund the purchase and construction of agriculture facilities in secondary schools through cost-sharing with parents.
- (v) Agriculture teachers with lower academic qualifications such as diploma should be encouraged by the government through the Teachers Service Commission (TSC) to pursue degree programmes.
- (vi) The government should strive to retain experienced agriculture teachers in secondary schools by, among other ways, better remuneration.

5.5 Recommendations for Further Studies

The following gaps were realized during the study and if addressed may help in improving public mixed day secondary schools girls' performance in agriculture:

- (i) Determine the factors affecting the use of agriculture facilities in teaching and learning of agriculture by girls in public mixed day secondary schools.
- (ii) Determine the factors influencing use of practical, demonstration, and project methods in teaching and learning of agriculture by girls in public mixed day secondary schools.

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APPENDIX A

LETTER OF INTRODUCTION

Dear Sir,

I am a Master in Science (Agricultural Education) degree student in Egerton University, Njoro Campus. I am conducting a research on socio-economic determinants of girls' performance in agriculture in Kirinyaga Central sub - county's public mixed day secondary schools as a partial fulfillment of the course requirements.

I kindly request you to spare some time and fill in this questionnaire to assist me in conducting this research. Please do not write your name on the questionnaire. The information you give will be treated with great confidentiality.

Your assistance in facilitating the research will be highly appreciated.

Thank you.

Muriithi Paul Muchira

EM11/2895/11

APPENDIX B

STUDENTS' QUESTIONNAIRE

Introduction

Please note that your views in form of answers to these questions will be treated confidentially. Note that there is no right or wrong answer.

Instructions for filling the Questionnaire

Fill in your answer to all questions in the spaces provided.

Do not indicate your name anywhere in the questionnaire. It is absolutely important that all sections have a response. Your responses should be based on your experience in the recent past.

SECTION A: Parental Factors

This section is designed to help me understand the family environment that influence students' performance in agriculture. Please tick (✓) where appropriate for your case.

Demographic Characteristics of the Girl's Parent/Guardian

1. What is your father's/ male guardian's occupation? (**Tick ALL applicable**)

- | | | | |
|-----------------------|--------------------------|---------------------|--------------------------|
| a) Casual laborer | <input type="checkbox"/> | g) Nurse | <input type="checkbox"/> |
| b) Small scale farmer | <input type="checkbox"/> | h) Civil servant | <input type="checkbox"/> |
| c) Teacher | <input type="checkbox"/> | i) Driver | <input type="checkbox"/> |
| d) Tailor | <input type="checkbox"/> | j) Policeman | <input type="checkbox"/> |
| e) Carpenter | <input type="checkbox"/> | k) Any other (Name) | _____ |
| f) Business man | <input type="checkbox"/> | | |

2. What is your mother's/female guardian's occupation? (**Tick ALL applicable**)

- | | | | |
|-----------------------|--------------------------|---------------------|--------------------------|
| a) Casual laborer | <input type="checkbox"/> | e) Nurse | <input type="checkbox"/> |
| b) Small scale farmer | <input type="checkbox"/> | f) Civil servant | <input type="checkbox"/> |
| c) Teacher | <input type="checkbox"/> | g) Business woman | <input type="checkbox"/> |
| d) Tailor | <input type="checkbox"/> | e) Any other (Name) | _____ |

Parent's/Guardian's Education

3. a) What is the level of your father's/male guardian's education? (**Where applicable**)

- | | | |
|----------------------|--------------------------|---|
| University graduate | <input type="checkbox"/> | 5 |
| Diploma education | <input type="checkbox"/> | 4 |
| Form four level | <input type="checkbox"/> | 3 |
| Standard eight level | <input type="checkbox"/> | 2 |
| Below standard eight | <input type="checkbox"/> | 1 |

b) What is your mother's/female guardian's education level? (**Where applicable**)

- | | | |
|----------------------|--------------------------|---|
| University graduate | <input type="checkbox"/> | 5 |
| Diploma education | <input type="checkbox"/> | 4 |
| Form four level | <input type="checkbox"/> | 3 |
| Standard eight level | <input type="checkbox"/> | 2 |
| Below standard eight | <input type="checkbox"/> | 1 |

Parental Support

1. My parent/guardian guides me whenever I am faced with school related problems.

Strongly agree	<input type="checkbox"/>	5	Disagree	<input type="checkbox"/>	2
Agree	<input type="checkbox"/>	4	Strongly disagree	<input type="checkbox"/>	1
Moderately agree	<input type="checkbox"/>	3			

2. My parent/guardian provides for me necessary personal effects such as sanitary pads.

Strongly agree	<input type="checkbox"/>	5	Disagree	<input type="checkbox"/>	2
Agree	<input type="checkbox"/>	4	Strongly disagree	<input type="checkbox"/>	1
Moderately agree	<input type="checkbox"/>	3			

3. My parent/guardian provides me with a home environment that is conducive for learning agriculture.

Strongly agree	<input type="checkbox"/>	5	Disagree	<input type="checkbox"/>	2
Agree	<input type="checkbox"/>	4	Strongly disagree	<input type="checkbox"/>	1
Moderately agree	<input type="checkbox"/>	3			

4. My parent/guardian is very concerned about what I score in agriculture tests.

Strongly agree	<input type="checkbox"/>	5	Disagree	<input type="checkbox"/>	2
Agree	<input type="checkbox"/>	4	Strongly disagree	<input type="checkbox"/>	1
Moderately agree	<input type="checkbox"/>	3			

5. With my parent/guardian's guidance I would pass well in agriculture.

Strongly agree	<input type="checkbox"/>	5	Disagree	<input type="checkbox"/>	2
Agree	<input type="checkbox"/>	4	Strongly disagree	<input type="checkbox"/>	1
Moderately agree	<input type="checkbox"/>	3			

6. My parent/guardian usually comes to school to discuss my studies with teachers.

Strongly agree	<input type="checkbox"/>	5	Disagree	<input type="checkbox"/>	2
Agree	<input type="checkbox"/>	4	Strongly disagree	<input type="checkbox"/>	1
Moderately agree	<input type="checkbox"/>	3			

7. My parent/guardian encourages me to work hard so that I pass well in agriculture.

Strongly agree	<input type="checkbox"/>	5	Disagree	<input type="checkbox"/>	2
Agree	<input type="checkbox"/>	4	Strongly disagree	<input type="checkbox"/>	1
Moderately agree	<input type="checkbox"/>	3			

8. My parent/guardian monitors me to see whether I am doing studies while at home.

Strongly agree	<input type="checkbox"/>	5	Disagree	<input type="checkbox"/>	2
Agree	<input type="checkbox"/>	4	Strongly disagree	<input type="checkbox"/>	1
Moderately agree	<input type="checkbox"/>	3			

9. My parent/guardian provides me with materials for learning agriculture such as revision materials.

Strongly agree	<input type="checkbox"/>	5	Disagree	<input type="checkbox"/>	2
Agree	<input type="checkbox"/>	4	Strongly disagree	<input type="checkbox"/>	1
Moderately agree	<input type="checkbox"/>	3			

10. My parent/guardian emphasizes to me the value of education.

Strongly agree	<input type="checkbox"/>	5	Disagree	<input type="checkbox"/>	2
Agree	<input type="checkbox"/>	4	Strongly disagree	<input type="checkbox"/>	1
Moderately agree	<input type="checkbox"/>	3			

11. My parent/guardian emphasizes to me the need to pass well in agriculture.

Strongly agree	<input type="checkbox"/>	5	Disagree	<input type="checkbox"/>	2
Agree	<input type="checkbox"/>	4	Strongly disagree	<input type="checkbox"/>	1
Moderately agree	<input type="checkbox"/>	3			

SECTION B: Involvement in Household Chores

This section is designed to help the researcher get a better understanding of the extent to which household chores affect students' academic performance. Please think about the household chores that you are usually engaged in while at home. Where appropriate, mark the answer that best represents how you feel about each of the statements below.

1. To what extent do you agree that you engage in household chores before going to school?

Strongly agree	<input type="checkbox"/>	5
Agree	<input type="checkbox"/>	4
Moderately agree	<input type="checkbox"/>	3
Disagree	<input type="checkbox"/>	2
Strongly disagree	<input type="checkbox"/>	1

2. To what extent do you agree that you engage in household chores after school?

Strongly agree	<input type="checkbox"/>	5
Agree	<input type="checkbox"/>	4
Moderately agree	<input type="checkbox"/>	3
Disagree	<input type="checkbox"/>	2
Strongly disagree	<input type="checkbox"/>	1

3. To what extent do you agree that you are engaged in household chores during the weekends?

Strongly agree	<input type="checkbox"/>	5
Agree	<input type="checkbox"/>	4
Moderately agree	<input type="checkbox"/>	3
Disagree	<input type="checkbox"/>	2
Strongly disagree	<input type="checkbox"/>	1

4. To what extent do you agree that domestic chores occupy most of your time when at home?

- Strongly agree 5
Agree 4
Moderately agree 3
Disagree 2
Strongly disagree 1

5. From the following list of domestic chores, rank them beginning with the one you most frequently do and end with the one that you least do. Assign them numbers as follows:

Most Frequently Done = 1; Frequently Done = 2; Moderately Frequently Done = 3;
Less Frequently Done = 4; Least Frequently Done = 5; Not Done at All = 6

- i. Baby sitting
ii. Fetching water
iii. Collecting firewood
iv. Cleaning the house
v. Washing utensils

APPENDIX C

AGRICULTURE TEACHERS' QUESTIONNAIRE

Introduction

This questionnaire is designed to help the researcher understand to what extent school factors influence girls' performance in agriculture. Please think about the statements below and mark the answer that best represents how you feel about each of them.

SECTION A: Personal Information

1. Tick your gender
Male Female
2. What is your academic qualification?
Master 5 Certificate 2
Bachelor's degree 4 K.C.S.E only 1
Diploma 3
3. Indicate your teaching experience
13 years and above 5
Between 10-12 years 4
Between 7-9 years 3
Between 3-6 years 2
Below 3 years 1

SECTION B: School Facilities

4. a) Do you have a school farm or agriculture demonstration plots in your school?
Yes 2 No
 - b) If yes, to what extent are the school farm/demonstration plots adequate for teaching and learning agriculture for girls?
Very adequate 5 Less adequate 2
Adequate 4 Not adequate 1
Moderately adequate 3
 - c) How often do you use the school farm/demonstration plots for teaching girls agriculture through practicals and demonstrations?
Very often 5 Less often 2
Often 4 Never use them 1
Moderately often 3
5. a) Do you have farm tools and equipment in your school?
Yes 2 No 1

b) If yes, to what extent are they adequate for teaching and learning agriculture for girls?

Very adequate 5 Less adequate 2

Adequate 4 Not adequate 1

Moderately adequate 3

8. a) Do you have agriculture text books in your school?

Yes 2 No 1

b) If yes, to what extent are they adequate for teaching and learning agriculture for girls?

Very adequate 5 Less adequate 2

Adequate 4 Not adequate 1

Moderately adequate 3

9. a) Do you have farm structures in your school?

Yes 2 No 1

b) If yes, to what extent are they adequate for teaching and learning agriculture for girls?

Very adequate 5 Less adequate 2

Adequate 4 Not adequate 1

Moderately adequate 3

APPENDIX D

RESULTS OF KCSE AGRICULTURE EXAMINATION (2009 - 2012)

NAME OF SCHOOL	YEAR							
	2009		2010		2011		2012	
	M	F	M	F	M	F	M	F
KIARITHA	42.3	40.0	46.9	45.9	50.6	53.7	49.2	44.0
KARAINI	44.1	39.0	47.9	39.0	52.9	45.5	49.5	40.5
KIANDIERI	30.0	36.6	33.3	32.4	37.4	35.2	40.2	35.8
KIAMURUGA	26.5	21.7	24.4	26.1	29.3	26.8	36.4	33.2
THAITA	30.6	26.4	36.5	23.4	42.3	28.0	35.4	31.6
GATWE	24.8	34.4	33.4	29.0	37.7	28.5	35.3	19.5
MUTUMA	26.0	29.0	29.0	25.8	35.5	25.1	28.4	20.9
MUTITU	28.8	27.3	35.6	26.2	30.7	23.4	30.8	34.1
KIAGA	25.0	14.0	33.2	26.8	29.1	24.9	25.8	21.2
GAKOIGO	26.4	23.4	27.1	24.7	27.4	25.3	29.6	20.1
MUKINDURI	18.3	17.8	34.0	23.6	33.0	26.2	29.7	21.0
KIARUGU	27.4	15.6	41.5	25.3	28.9	28.0	21.8	24.7
MUGWANDI	21.3	16.9	27.0	21.0	28.7	28.6	29.9	25.4
KIAMAINA	29.0	25.9	23.8	17.9	27.7	22.8	26.0	22.5
GITWE	-	-	19.0	21.0	28.7	19.7	20.5	16.0
KIRIGO	-	-	24.5	17.5	27.9	14.8	19.1	20.8
WAIGIRI	-	-	17.2	12.0	24.9	21.7	32.1	21.8
KIABARIKIRI	27.0	23.6	28.7	22.9	21.3	19.6	28.9	25.0
SACRED HEART	-	-	-	-	19.4	19.5	18.0	18.8
AVERAGE MEAN SCORES	28.5	26.1	31.3	25.6	32.3	27.2	30.9	26.2

Source: Kenya National Examinations Council (KNEC).

APPENDIX E

NUMBER OF GIRLS TAKING AGRICULTURE

**Population of Form Three Girls Taking Agriculture in Kirinyaga Central Sub –
County’s Public Mixed Day Secondary Schools in 2013**

NAME OF SCHOOL	NUMBER OF FORM THREE GIRLS TAKING AGRICULTURE
ST. JAMES KIARITHA	17
KARAINI	16
KIANDIERI	12
KIAMURUGA	24
ST. JOHN THAITA	5
GATWE	18
MUTUMA	4
MUTITU	13
KIAGA	13
GATUTO	6
GAKOIGO	8
MUKINDURI	4
KIARUGU	10
MUGWANDI	6
KIAMAINA	9
GITWE	6
KIRIGO	2
ST. FRANCIS WAIGIRI	7
KIABARIKIRI	9
SACRED HEART	6
TOTAL	195

Source: Form Three Agriculture Class Lists of Respective Schools.

APPENDIX F

STANDARDIZED FORM THREE AGRICULTURE EXAMINATION

Standardised Form Three Agriculture Paper

Total Marks: 80

Time: 2 Hours

Instructions:

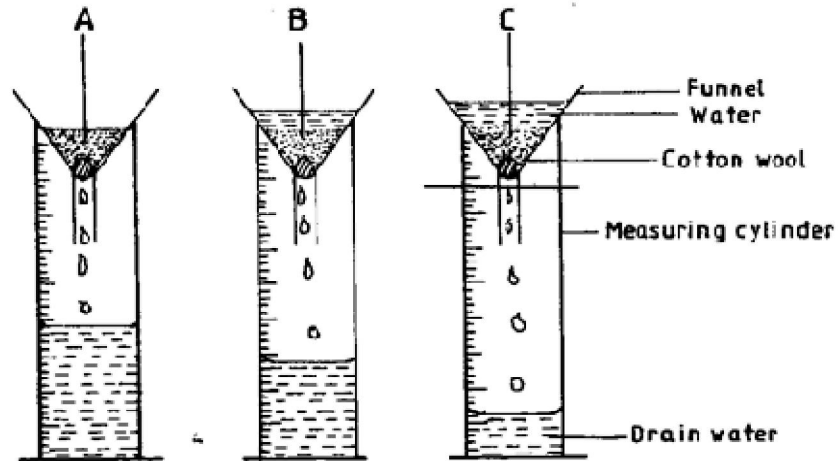
Answer All Questions in the Spaces Provided.

1. State the difference between a vector and an intermediate host in livestock production. (1mk)
2. State two functions of carbohydrates in an animal's body. (2mks)
3. State three factors that lead to small scale farming in Kenya. (1 ½ mks)
4. Give four advantages of mulches on crops. (2mks)
5. State four disadvantages of row planting in crops establishment. (2 mks)
6. Give two importance of chitting in potato production. (1mk)
7. Give four effects that would be brought about by the addition of adequate amount of farmyard manure to sandy soil. (2mks)
8. Define the following terms in routine field practices. (1 ½ mks)
 - i. training
 - ii. rogueing
 - iii. tipping
9. State three factors that would determine the amount of concentrate fed to dairy cattle. (1 ½ mks)
10. Give three effects of external parasites that are harmful to livestock. (1 ½ mmks)
11. (a) Name four breeds of dairy goats. (2mks)
(b) Mention two distinguishing characteristics of the Bacterian camel breed. (1mk)
12. State five methods of maintaining good health in livestock. (2 ½ mks)
13. List three methods of treating water for use on the farm. (1 ½ mks)
14. Give two examples for each of the following categories of water pipes.
 - a. Metal pipes (1mk)
 - b. Hose pipes (1mk)
15. List two methods of budding that are used in propagation of plants. (1mk)
16. Give two reasons for locating a nursery bed at a well sheltered place. (1mk)
17. State four ways in which burning of vegetation may lead to loss of soil fertility. (2mks)
18. Give two forms in which nitrogen is absorbed from the soil by plants. (1mk)

19. Give two roles of soil micro-organisms that are beneficial to crops. (1mk)

20.

The diagram below illustrates an experiment on soil. Study it carefully and answer the questions that follow.



(a) State the aim of the experiment. (1 mark)

.....
.....

(b) If the volume of water illustrated in the measuring cylinders was observed after one hour, identify the soil samples labelled A and B.

A (1/2 mark)

B (1/2 mark)

(c) State **two** ways in which the soil structure of the soil sample labelled C above can be improved. (2 marks)

.....

21. What is the function of each of the following ingredients in the preparation of compost manure?

a. Wood ash (1mk)

b. Top soil. (1mk)

22. The diagram below illustrates a field management practice in tomatoes. Study it carefully and answer the questions that follow.



(i) identify the field practice. (½ mark)

.....

(ii) state three reasons for carrying out the practice. (1½ marks)

.....

.....

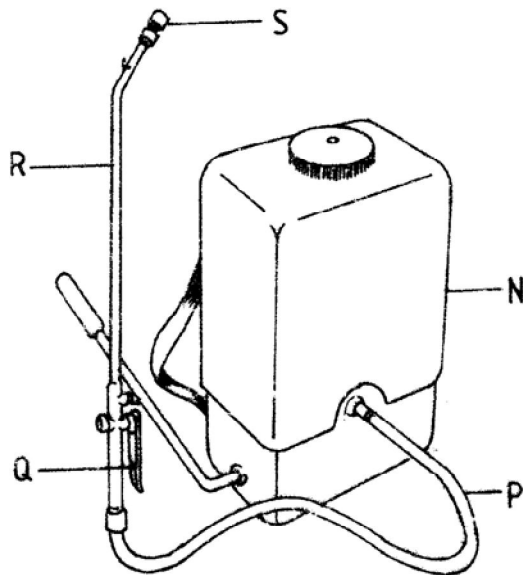
.....

23. State four characteristics of roughage livestock feeds. (2mks)

24. State two functions of the crop in poultry digestive system. (1mk)

25.

Below is a diagram of a knapsack sprayer. Study it carefully and answer the questions that follow.

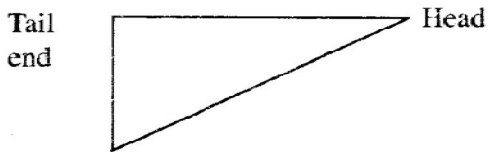


a) Name the parts labeled N, P, Q and R (2 mks).

N
P
Q
R

b) State one function of the part labeled S. (1mk)

26. The diagram below illustrates the general shape of a cattle breed. Study it carefully and answer the questions that follow.



(a) Identify the type of breed illustrated by the above shape. (½ mark)

.....

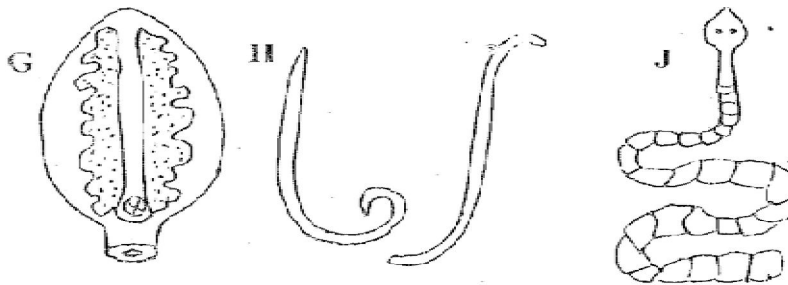
(b) Give an example of a breed in (a) above. (½ mark)

.....

(c) State **four** physical characteristics of the type of breed identified in (a) above. (2 marks)

27. Explain five functions of water in nutrition. (5mks)

28. Diagrams G, H and J illustrates some livestock parasites.



a) Identify parasites G, H and J (1 ½ mks)

G

H

J

b) State the category of parasites G, H and J. (½ mks)

c) Name the parts of the host's body where parasites G and J are found. (1mk)

G

J

d) Name the intermediate hosts of parasite G and H. (2mks)

G

H

e) Name two forms in which parasite G is found in the host's body. (2mks)

29. (a) Describe measures which should be taken to minimize water pollution on a farm. (10mks)
- (b) State five soil factors that should be considered when selecting a crop to grow in an area. (5mks)
- (c) Give five harmful effects of liver flukes in sheep rearing. (5mks)

APPENDIX G

MARKING SCHEME

Standardised Form Three Agriculture Paper Marking Scheme

1. Difference between a vector and an intermediate host.

- A vector carries a disease causing organism e.g. a protozoa from a sick animal to a healthy animal during its feeding e.g. tsetsefly while an intermediate host carries a parasite in its body during the parasites life cycle e.g. water snail and the liver fluke.

(1 x 1 = 1mk)

Mark as whole.

2. Functions of carbohydrates

- Source of energy for respiration, digestion etc.
- Raw material to synthesize animal products e.g. milk, meat, wool.
- Excess carbohydrates are stored as fat under the skin hence act as an insulation to heat loss

2 x 1 = 2mks

3. Factors that lead to small scale farming in Kenya.

- Lack of enough land
- Limited capital
- Government policy
- Lack of market/incentives (½ x 3 = 1 ½ mks)

4. -Mulches reduce soil erosion

- Increases water infiltration
- Add organic matter to the soil on decomposition
- Improve soil temperatures
- Assist in controlling certain pest e.g. banana weevils in banana
- Increase the yield of some crops
- Smoother/control weeds (4 ½ = (2mks)

5. - Requires skills e.g in measuring distances

- It is expensive
- Labour demanding
- Encourage soil erosion as a lot of spaces are left uncovered on soil surface.
- Land is not used fully/not fully utilized. (4 x ½ = 1 ½ mks)

6. - The crop gives uniform growth

- Encourage the production of short green and healthy sprout. 2 x ½ = 1 mk

7. -Improved soil structure because of binding of soil particles.

- Improved microbial activity in the soil.
- Improved nutrient level/fertility of soil
- Impart of a dark colour to the soil that helps to increase soil temperature.

- Increase soil cation exchange capacity PH control.
 - Improved water retention capacity in the soil.
 - Reduced leaching.
8. (i) **Training**- involve manipulating plants to grow in the shape and direction one wants through staking, propping and trellising. (½ mk)
- (ii) **Roguing** – is the removal through uprooting and destruction of plants that are diseased or have undesirable characteristics. (½mk)
- (iii) Is the removal of an apical shoot with tea leaves and a bud at 2 to 3 weeks interval during formative pruning and pegging after formation of plucking table. (½ mk)
- 9. Three factor that would determine the amount of concentrate fed to cattle.**
- Body size weight of the animal.
 - Physiological conditions within which the animal is.
 - Environmental conditions within which the animal is.
 - Level of production. (1 ½ mk)
- 10. Three effects of external parasites that was harmful to livestock**
- Cause anaemia
 - Disease transimission
 - Cause irritation
 - Injury and damage on the skins and hides of animals. (1 ½ mk)
- 11. (a) four breeds of dairy goats**
- Saanen
 - Toggenburg
 - British Alpine
 - Anglo nubian
 - Jamnapari (2mks)
- (b) Two distinguishing characteristics of the bacteria camel breed.**
- Two humps
 - Heavily built than dromedary
 - Shorter legs than dromedary
- 12. five methods of maintaining good health in livestock**
- Proper feeding and nutrition
 - Proper breeding and selection
 - Proper housing and hygiene
 - Isolation of sick animals
 - Imposing quarantine
 - Prophylactic measures and treatment
 - Slaughtering the affected animals
 - Use of piseptics and disinfectants.
- 13. Methods of treating water**
- Chemical treatment/chlorination/soda ash/sodium hypochloric
 - Filtration
 - Boiling
 - Aeration
 - Sedimentation/decantation/use of alum(aluminiumsulphate)
 - Storage for 36 hours (1 ½ mks)

14. Examples of water pipes

a. Metal pipes

- i. Galvanized iron pipes/steel pipes
- ii. Aluminium pipes
- iii. Copper pipes (2 x ½ mks) (1mk)

b. Hose pipes

- i. Rubber hose pipes
- ii. Plastic hose pipes/pvc pipes /polyvinyl chloride pipes (2 x ½ mk)

15. Methods of budding

- i. T-budding
- ii. Top budding
- iii. Patch budding (2 x ½ mks) (1mk)

16. Reasons for siting a nursery under shelter

- i. Reduce damage to seedlings by strong wind.
- ii. Reduce evaporation/transpiration rate due to strong sun and wind.
(2 x ½) (1mk)

17. Burning of vegetation

- i. Destroys organic matter/humus
- ii. Destroys soil structure
- iii. Kills useful soil micro-organisms
- iv. Exposes soil to agent of erosion
- v. Causes nutrient imbalance/loss of volatile nutrients/accumulation of soils/alters
- vi. Destroys soil water/loss of soil water (4 x ½) (2mks)

18. Forms of Nitrogen

- i. Nitrate form/Nitrate ions/ NO_3^-
- ii. Ammonium form/ammonium ions/ NH_4^+

19. Roles of soil micro-organisms

- i. Decomposition of organic matter to release plant nutrients
- ii. Some fix nitrogen/sulphur into soil.
- iii. Some produces toxic substances that help control soil borne diseases. (2x ½) (1mk)

20. (a) To compare porosity/drainage infiltration/water holding capacity of different soils.

(b) identification of soil samples

A - Sandy soil

B - Loamy soil (2 x ½) (1mk)

(c) Improve soil structure of soil sample C.

- (i) Adding organic matter/manure
- (ii) Liming
- (iii) Sub soiling/proper tillage
- (iv) Draining away excess water (2 x 1) (2mks)

21. Functions of ingredients

a. Wood ash

- Improves level of phosphorus & potassium in the manure.
- Modifies soil pH to enhance microbial activities/

- Reduces acidity. (1 x 1) (1mk)
 - b. Top soil
 - Introduces micro-organisms necessary for decomposition of organic materials. (1 x 1) (1mk)
22. (i) Staking (1 x ½ mk)
- (ii) Reasons for staking**
- Enhances production of clean fruits/improves quality of fruits.
 - Helps in controlling diseases.
 - Facilitates spraying/harvesting of the crop/weeding/pruning
 - Prevents infestation by soil borne pests. (3 x ½ mks) (1 ½ mk)
- 23. four characteristics of roughage livestock feeds.**
- Bulky
 - High fiber content
 - Low nutrients content
 - Low digestibility
 - Mainly of plant origin
- 24. Two functions of the crop in poultry digestive system**
- Softening/moistening food.
 - Temporary food storage
25. Parts labeled N, P, Q and R (2mks)
- N tank
P delivery hose
Q Trigger
R lance
26. (a) Dairy breed. (½ mk)
- (b) Example of breed in (a) above** (½mk)
Friesian/jersey/guernsey/Ayrshire
- (c) four physical characteristics of the type of breed identified in (a) above**
- Lean bodies/thinly fleshed bodies
 - Large stomach
 - Small head and long neck
 - Straight topline
 - Wedge/triangular shaped
 - Large and well developed udders and teats
 - Prominent milk veins
 - Long thin legs
 - Prominent visible pinbone.
- 27. Function of water**
- Component of body cells and many body fluids e.g. blood.
 - Used in biochemical reactions in the body e.g digestion.
 - Regulate body temperature through sweating and evaporation.
 - Excretion of metabolic wastes from the body.
 - Formation of products e.g milk, eggs etc
 - Makes cells turgid to maintain their shapes
 - Transportation of nutrients from one point to another. (5 x 1 = 5mks)

28. (a) Identify of parasite

G – liverfluke (fasciolasp)

H- roundworms (ascarissp)

J – tapeworms (taeniasp)

(3 x ½ mk(1 ½ mks)

b) Category of parasites named

internal/endo-parasite

(1 x ½ = ½ mks)

c) parts where found

G found in the bile duct/gall blader/liver

J found attached on the walls of the small intestines (2 x ½ mks)

d) intermediate hosts of

G – water/ mud snail (limnoleatraun-catula)

J – cattle/sheep/goats and pigs

2 x 1 = 2mks)

e) Form in which parasite G is found in hosts body

- Eggs

-Adult

-Cysts

2 x 1 = (1mk)

29. (a) Measures to minimize water pollution

- i. By avoiding cultivation along water sources such as rivers.
- ii. Avoiding cultivation during dry and windy periods.
- iii. Prohibiting settlement of people near river valleys or water catchment areas.
- iv. Prohibiting the excessive use of agrochemicals.
- v. Practicing soil conservation measures such as terracing, mulching, contour farming
- vi. Fencing of water sources
- vii. By using integrated pest management (IPM) systems.
- viii. By using efficient pesticide application techniques.
- ix. By substituting or use of less toxic or less persistent or less leachable or less biodegradable pesticides.
- x. By planting vegetation along the river banks to reduce siltation in rivers. The vegetation also captures harmful materials from farms.
- xi. Maintaining correct/appropriate stocking rate/avoid overgrazing.
- xii. Proper disposal of waste and containers
- xiii. Proper treatment of waste before disposal. (10 x 1) (10mks)

b. Soil factors that determine a crop grown in an area.

- Soil drainage : rate of water infiltration and percolation through the soil.
- Soil structure: arrangement of soil particles or aggregates
- Soil nutrient content: variety and quantity of mineral nutrients in the soil.
- Soil profile/soil depth: depth and arrangement of soil horizons in relation to the rooting system of the crop

- Soil pH chemical properties of the soil/degree of acidity or alkalinity of the soil solution.
- Soil borne pests and diseases – the prevalent pests/diseases in the soil.
(5 x 1) (5mks)

c. **Harmful effects of liver flukes in sheep**

- Digestion upsets due to blocking of bile ducts
- Emaciation leading to death
- Anemia- distraction of the liver tissues
- Swollen lower jaw/edema in the jaws
- Swollen abdomen
- Destruction of the liver (5x 1) (5mks)

APPENDIX I

RESEARCH PERMIT

REPUBLIC OF KENYA



NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

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NCST/RCD/14/013/748

Date:

20th May, 2013

Paul Muriithi
Egerton University
P.O.Box 536-20115
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RE: RESEARCH AUTHORIZATION

Following your application dated 8th May, 2013 for authority to carry out research on "*Socio-economic determinants of girls' performance in agriculture in Public Mixed Day Secondary Schools in Kirinyaga Central District, Kirinyaga County, Kenya,*" I am pleased to inform you that you have been authorized to undertake research in **Kirinyaga Central District** for a period ending 31st December, 2013.

You are advised to report to the **District Commissioner and the District Education Officer, Kirinyaga Central District** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

DR. M. K. RUGUTT, PhD, HSC.
DEPUTY COUNCIL SECRETARY

Copy to:

The District Commissioner
The District Education Officer
Kirinyaga Central District.