

**RELATIONSHIP BETWEEN SCHOOL FARM FACTORS AND THE
ACQUISITION OF AGRICULTURAL SKILLS AMONG SECONDARY SCHOOL
STUDENTS IN MALAVA SUB-COUNTY, KAKAMEGA COUNTY, KENYA**

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**A Thesis Submitted to the Graduate School in Partial fulfilment of the Requirement of
the Degree of Master of Science in Agricultural Education of Egerton University**

EGERTON UNIVERSITY

SEPTEMBER, 2025

DECLARATION AND RECOMMENDATION

Declaration

This thesis is my original work and has not been submitted for the award of degree or diploma, in this or any other university.

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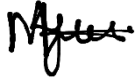
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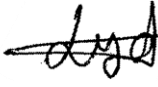
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DEDICATION

To my grandfather Chikamai Recha Shikanga, to my mother Jackline Atieno Recha.

ACKNOWLEDGEMENTS

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ABSTRACT

One of the objectives of teaching agriculture in secondary schools is to equip students with hands-on farming skills. This is considered as one of the ultimate panacea to achieving youth employment and boosting food security. A school farm is considered a necessity in the implementation of the agriculture curriculum for acquisition of practical skills. However, there is limited research on the integration of the school farm and its associated facilities in the teaching of agriculture for skill acquisition. This study therefore, aimed at establishing the relationship between school farm factors and the acquisition of agricultural skills. Correlational research design was adopted. The study targeted 1532 secondary school teachers and 4327 form three students in Malava Sub-County. Out of the target population, the study purposively narrowed down to 171 teachers of agriculture and 2532 form three students of agriculture who formed the accessible population. Based on Nassiuma formula, 15 schools were sampled. Based on the Yamane formula, 150 form three students of agriculture were sampled. One teacher of agriculture from each of the 15 schools participated in the study. The data collection tools used included two sets of questionnaires and an observation guide. To determine the instruments' validity, a pilot study was conducted in Khwisero Sub-County. The teachers' questionnaire had a Cronbach's alpha of 0.89 while that of the students had 0.72. The observation guide's reliability was established through qualitative analysis with the guidance from the supervisors. The statistical tool employed for data analysis was chi-square test of relationship using the Statistical Package for Data analysis (SPSS) version 26. The study established that among the school farm factors, levels of access, utilization and adequacy of the school farm have a statistically significant relationship to the level of agricultural skill acquisition. The study recommended that in order to enhance level of access to the school farm especially during lesson time, more time needs to be allocated to agriculture on the timetable. To improve on adequacy, management through the school principals should strive to procure more land. To enhance level of utilization, the study recommended that the teachers of agriculture should adhere to the syllabus guidelines of implementing not only the theoretical aspect of the subject but also incorporating the suggested practical activities for skill acquisition.

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LIST OF ABBREVIATIONS AND ACRONYMS

CBA	Competence Based Agriculture
CBC	Competence Based Curriculum
CDE	County Director of Education
FAO	Food and Agriculture Organization
FDSE	Free Day Secondary Education
FFA	Future Farmers of America
GoK	Government of Kenya
ILO	International Labour Organization
KCSE	Kenya Certificate of Secondary Education
KICD	Kenya Institute for Curriculum Development
KIE	Kenya Institute of Education
KIPPRA	Kenya Institute for Public Policy Research and Analysis
KNEC	Kenya National Examinations Council
MoEST	Ministry of Education, Science and Technology
NACOSTI	National Commission for Science, Technology and Innovation
SCDE	Sub-County Director of Education
SDGs	Sustainable Development Goals
SPSS	Statistical Package for Social Sciences
STR	Student-Teacher Ratio
TSC	Teachers' Service Commission
USA	United States of America
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Agriculture marked the beginning of human civilization when our ancestors abandoned their nomadic life characterised by hunting and gathering and began cultivate crops and rear livestock in organized settlements (Fuseini, 2020). Even up to this 21st century, the sector still remains to be of economic relevance to most nations globally. (Ogemah, 2017) points out that agriculture feeds the world and contributes to eradication of poverty. Based on the Food and Agricultural Organization (FAO) (2019) report, achievement of food security globally is hinged on stability in the international food market and focus on improving agricultural output in food insecure regions.

Technological advancement coupled with acute food shortage has prompted a change in the implementation of school agriculture curriculum with more inclination to a practical approach (Haruna et al., 2019). According to Chepng and Boit (2015), there is a growing need for hands-on agricultural skills which demands for a type of education that can enable the learner in making informed decisions relating to the current farming trends. Mulder (2017) posits that a well- trained workforce contributes to the economic growth of a country since education is perceived as a means of enhancing level of knowledge and skills. Jones et al. (2017) argue that the need to sustainably meet the dietary needs of the increasing human population can best be achieved by having a better drive and investment in agricultural education. Agricultural education has been defined differently by various scholars. Ekezie and Owo (2019) defined it as the process of passing on desirable agricultural knowledge, attitudes and skills from the teacher to the student mainly through practical experiences. On the other hand, (Haruna et al., 2019) defined it as a kind of vocational programme that instils knowledge and skills in productive agriculture and involves both the psychomotor and cognitive domains. By involving both the psychomotor and cognitive domains, the holistic implementation of the agriculture curriculum demands for a practical approach.

Unlike general education, agricultural education is skill-oriented as it entails a lot of activities that must be conducted outside the classroom with the aim of exposing learners to real farming experiences so as to acquire essential practical skills (Cheruiyot, 2018). According to Karani et al. (2024), agricultural education touches on food security and poverty alleviation thus worth being emphasized especially in the third world countries which are comparatively less industrialised and where food insecurity and austerity are still common a phenomenon. Agriculture at the basic levels of education is considered as a pre-vocational subject since the

skills acquired at this level can place a learner in a better position to identify gaps and opportunities along the agricultural value chain. Haruna et al. (2019) posit that learning practical agriculture at school prepares the trainee for the world of work.

Several past studies have revealed that there exists a relationship between studying agriculture in secondary school and level of productivity among farmers due to acquisition of farming skills and knowledge (Kyule et al. 2015; Manyasi 2019). Kyule et al. (2015) established that farmers with secondary school agriculture experience achieved more production in poultry farming than their counterparts without any formal education. The higher productivity was attributed to their ability to adopt modern poultry rearing systems such as the battery cage and make informed decisions relating to feeding, treatment and pest control. (Kyule & Konyango, 2019) established that out of the large number of secondary school agriculture graduates, only a few end up joining tertiary learning institutions as a result of various underlying issues such as shortage of finance and failure to attain the minimum required grade. If well equipped with practical farming skills at the secondary school level, such individuals can significantly contribute to the agricultural value chain thus boosting the economic development of the country.

Owing to the vocational nature of agriculture and the numerous out of classroom activities involved, the use of an array of facilities and resources is necessary. Cheruiyot (2018) affirms that the practical implementation of topics in the secondary school agriculture syllabus such as Crop Production, Livestock Production, Farm Tools and Equipment and many others demands the incorporation of various facilities and resources. The paradigm shift to learner-centred approach further necessitates resource use during the instructional process as Deegan et al. (2016) associate their use to learner freedom which nurtures various competencies such as inquisitiveness, creativity and critical thinking which contribute to the acquisition of skills.

Educational facilities according to Edokpolor and Dumbiri (2019) are the physical structures set up in learning centres that contribute to the instructional process by providing a conducive environment. The school farm is arguably one of the most relevant facilities in agricultural education. Machisu et al. (2022) affirmed that school farms serve as laboratories that provide an avenue for practical teaching of agriculture. In the developed world, farming in schools can be traced back to the early 19th century where school farms were set up in the USA, Australia, and Europe with an aim of enhancing education standards through a practical approach to agricultural education (Christie, 2016). Pascoe and Wyatt-Smith (2013) pointed out that in Australian schools, there exists a variety of school gardens such as indigenous

gardens, kitchen gardens, garden clubs, and permaculture gardens which make it feasible to practically implement the subject.

In Africa, agricultural education aims at preparing human resource for employment in agricultural sector (Evelia, 2014; Njeru, 2017). With the rise in unemployment, austerity and food insecurity in the wake of the 21st century, the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2016) point out that there have been deliberate attempts to improve practical teaching of agriculture at school level so as to enable the students acquire hands-on experiences that are to be replicated in the field of work. Jones et al. (2017) posit that various organizations have heavily invested in agricultural education with an aim of preparing and expanding a skilful workforce to help in steering the African economy. There has also been a change in curricula in some of the African nations aimed at accommodating agriculture as a core subject (Jjuuko et al., 2019). Despite all these attempts, constraints still exist in the implementation of practical agriculture especially at the basic education levels. Chemjor (2016) for instance pointed out that teachers hardly use supervised practical lessons in the school farm and there is an inadequacy of farm tools and implements which in turn does not guarantee skill acquisition.

In Kenya, secondary school agriculture has two main objectives. The first objective is to enable the learner master elementary tenets of crop and livestock production applicable to the country at large and specific to their locale. The second objective is to expose learners hands-on farming experiences with the aim of nurturing their skills (KIE, 2006). These objectives cannot be achieved without exposing the learners to practical farming activities on the school farm which serves as a laboratory where agricultural projects are carried out. With high level of exposure to the school farm, students are likely to find the opportunity to conceptualise the abstract concepts learnt in the classroom into concrete realities therefore ensuring high chances of acquisition of practical agricultural skills (Onwumere et al., 2016).

Over the years, the number of students enrolling for agriculture has tremendously increased. Even after being made optional following the 2002 educational reforms, reports from the Kenya National Examination Council (KNEC, 2019) revealed that agriculture still remains the most popular optional subject among the technical subjects among students. Table 1 gives a summary of the national enrolment in agriculture from the year 2017 to 2022.

Table 1*National Agriculture Candidature in Kenya Since 2017*

Year	Total candidature	Agriculture students
2017	611,952	247,265
2018	660, 204	278,658
2019	697,222	289,315
2020	734,350	300,878
2021	822,933	317,692
2022	877,773	327,993

Source: Kenya National Examination Council (2022)

It is evident that enrolment is on a steady rise which can in turn provide an opportunity to impart practical agricultural skills to many students. Such students can then be better placed to join higher institutions of learning to pursue agriculture-related careers. Those who might not have the opportunity to further their studies after the secondary school level might as well join the world of work and utilize the practical agricultural skills they acquired in secondary school to boost on food security and create employment opportunities. The use of the school farm facility can help students acquire practical agricultural skills which can enable them to opt for agriculture related careers as well take active part in agricultural activities. Despite all these prospects, there are still challenges in terms of accessibility, utilization and adequacy of this facility.

Despite the opportunities and prospects in the agriculture sector as well as the increase in student enrolment in the subject, Sebotsa et al. (2021) affirmed that farming has been reserved for the aged while ironically, out-of school youth tend to be less engaged in agriculture. Several studies have linked this to various factors. Njeru and Gichimu (2015) for instance pointed out that most Kenyan youth lack access to credit and land which are vital in to start up and sustain farming. The scholars however affirmed that the Kenyan government as well as several NGOs are trying to address this problem through various means such as provision of financial support. However, the main cause behind the less engagement into agriculture by the youth is shortage of practical farming skills.

Research findings from Kyule et al. (2016) and Chemjor (2016) established that students hardly get the opportunity to engage in practical activities on the school farm which is a clear indicator towards the negligence of practical agriculture in favour of theory. Kyule

and Konyango (2019) highlighted that the theoretical teaching makes learners devoid of practical farming skills and pays little attention to employability. Despite the government putting in various strategies aimed at reviving the agricultural sector, agricultural education in secondary schools has been snubbed. This has culminated into disconnect between what is taught in school agriculture and the labour market needs (Kyule & Konyango, 2019).

Empirical studies from Malava Sub-County Education Office (2019), show that enrolment in agriculture has been on a steady rise over the past five years just as it is the case of the national context. This trend should serve as an opportune moment to equip this large number of students with practical agricultural skills that can enable them fit in the agricultural value chain upon graduation from secondary school. This can hasten the achievement of the Sustainable Development Goal of ending poverty and hunger. The rise in enrolment may however come with challenges with respect to the availability, adequacy, access and utilization of physical facilities. Feasibility of practical agriculture requires incorporation of the school farm and its associated facilities during the instructional process. This might however prove to be a mirage especially with such high enrolments. Table 2 presents KCSE candidature in Malava Sub-County since the year 2017.

Table 2

Agriculture Candidature in Malava Sub-County Since 2017

Year	Total candidature	Agriculture students
2017	3146	1411
2018	3432	1502
2019	3825	1608
2020	4019	2180
2021	4233	2434
2022	4529	2687

Source: Malava Sub-County Education office (2019)

Based on past research, school facilities contribute to students' choice of agriculture subject (Chemjor, 2016; Cheruiyot, 2018; Makori et al., 2019). However, very little is known on the contribution of the school farm facility towards students' acquisition of practical farming skills. It was therefore prudent to conduct research to ascertain the relationship between school farm factors and the level of agricultural skill acquisition among public secondary school

students. The school farm factors include; availability, adequacy, accessibility and level of utilization.

1.2 Statement of the Problem

Education for sustainable development aims not only at enhancing literacy levels but also equipping learners with life-long skills that can help them to take a centre role in economic development. Agriculture is crucial for the economic growth of Kenya. Practical agriculture in secondary schools is crucial when it comes to producing competent human resource capable of promoting self-employment as well as participating in agricultural production value chain hence food security. The school farm serves as the main avenue through which learners can put into practical use the theoretical concepts learnt in classroom through demonstrations, experiments and projects. Since agriculture attracts high student enrolment in Kenyan secondary schools, practical teaching at the school farm can provide an opportunity for learners to acquire competence-based training through participatory learning. To the contrary, most of the out- of- school youth lack practical agricultural skills thus tend to be less engaged in agriculture-related activities and careers. The rise in unemployment and food insecurity can be mainly attributed this, though there may be other underlying reasons. It was therefore prudent to establish the relationship between school farm factors and the acquisition of practical agricultural skills among secondary school students in Malava Sub-County.

1.3 Purpose of the Study

The purpose of the study was to determine the relationship between school farm factors and the acquisition of agricultural skills among secondary school students in Malava-Sub-County.

1.4 Objectives of the Study

The study sought to determine relationship between;

- i. Availability of the school farm and the acquisition of agricultural skills among secondary school agriculture students in Malava Sub-County.
- ii. Level of accessibility to the school farm and the acquisition of agricultural skills among secondary school agriculture students in Malava Sub-County.
- iii. Level of adequacy of the school farm and the acquisition of agricultural skills among secondary school agriculture students in Malava Sub-County.
- iv. Level of utilization of the school farm and the acquisition of agricultural skills among secondary school agriculture students in Malava Sub-County.

1.5 Research Hypotheses

The study tested the following null hypotheses:

- H0₁ There is no statistically significant relationship between availability of the school farm and the acquisition of agricultural skills among secondary school agriculture students in Malava-Sub-County.
- H0₂ There is no statistically significant relationship between level of accessibility to the school farm and the acquisition of agricultural skills among secondary school agriculture students in Malava-Sub-County.
- H0₃ There is no statistically significant relationship between level of adequacy of the school farm and the acquisition of agricultural skills among secondary school agriculture students in Malava-Sub-County.
- H0₄ There is no statistically significant relationship between level of utilization of the school farm and the acquisition of agricultural skills among secondary school agriculture students in Malava-Sub-County.

1.6 Significance of the Study

This study findings should inform agriculture students in secondary schools on the need to actively engage in hands-on practices within the school farm for the purpose of skill acquisition. Agriculture teachers as the curriculum implementers may use these findings to devise strategies of enhancing students' active participation in practical agriculture through the utilization of the school farm facility. The findings may also inform the local communities around the schools on the need of supporting practical teaching of agriculture through various ways such as leasing out of land to the schools. The findings may be used by school management to strategize on means of improving on the levels of adequacy, accessibility and utilization of facilities for learning practical agriculture. The findings will also enlighten curriculum developers (KICD) on the need to formulate policies that will favour higher levels of access and utilization of school farm facilities resulting to practically oriented agricultural graduates.

1.7 Scope of the Study

This study focused on establishing the relationship between school farm factors and the acquisition of agricultural skills among students of agriculture in public secondary schools in Malava Sub-County. This study gave an in-depth focus on the availability status, level of adequacy, accessibility and utilization of the school farm facility. Relationship between these selected factors and acquisition of practical skills in agriculture has never been determined in

Malava Sub-County. Level of acquisition of agricultural skills was the dependent variable and was denoted by students' ability to carry out crop and livestock production activities on the school farm.

1.8 Assumptions of the Study

The study was based on the following assumptions:

- i. Research design used was effective therefore giving a proper representation of the entire population.
- ii. Respondents gave unbiased and honest responses during data collection.

1.9 Limitations of the Study

A few sampled schools were unwilling to participate in the data collection exercise during lesson time. The limitation was addressed through re-scheduling time of data collection to games time, weekends and during tea breaks.

1.10 Definitions of Terms

Availability of the school farm facility: The extent to which a facility is reliable, serviceable and maintainable (Evelia, 2014). This term was used to refer to the existence and physical presence of the school farm together with the various associated sections such as commercial plots, museum plots, project plots, farm structures and demonstration plots.

Farm structures: The physical buildings found on the farm such as crushes, stores, fences, farmhouses, poultry houses, rabbit hutches and calf pens. Number and diversity was used as a form of measurement.

Level of accessibility: Refers to the ease of reach to an object of interest (Advance Learners' Dictionary, 2010). The term was used to refer to the location of the school farm and its associated facilities, implied by approximate distance from the tuition block and the frequency of visits to the facilities by the students.

Level of acquisition of agricultural skills: The extent to which vocational trainees acquire cognitive and psychomotor capabilities as a result of experiential learning (Achieng', 2012). This term was used to refer to the status of the projects and demonstrations in both crop and livestock production conducted by students on the school farm.

Level of adequacy: According to UNESCO (2012), this term refers to the ability of various educational resources and facilities to satisfy the demands of a given number of learners during the instructional process. For the purpose of this study, the term referred to class size with reference to the average school farm facility in square metres allocated to each student.

Level of utilization: Is the extent to which something is made use of (Oxford dictionary, 2010). In this study, the term referred to frequency to which students conduct demonstrations and projects on the school farm.

Museum plots: Section of the school farm reserved for growing exotic varieties of crops that have been discussed in the agriculture syllabus.

Practical agricultural skills: The psychomotor domain involving hands-on skills to practically carry out various operations especially those dealing with farm tools and machinery (Fuseini, 2020). In this study, this term was measured by the students' competency in carrying out demonstrations and projects in both crop and livestock production activities

Relationship: Refers to the association between two objects, variables or individuals (Advance Learners Dictionary). For the purpose of this study, the term refers to the extent to

which the availability, level of adequacy, accessibility and utilization of the school farm contributed to acquisition of practical farming skills

School category: Classification of schools based on the Ministry of Education guidelines.

Based on this classification, a school belongs to either National, Extra-County, County or Sub-County category.

School farm: A section of land within the school compound reserved specifically for experiential teaching of agriculture (Iderawumi et al., 2021). In this context, the term was used to refer to a portion of land allocated for practical implementation of the agriculture curriculum with the aim of equipping learners with agricultural skills.

Technical subjects: This is a group of subjects which equips students with Hands-on skills (Ekezie & Owo, 2019). In this context, the term referred to agriculture subject.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter was reviewed under the following sub-headings: Contribution of agriculture to the Kenyan economy, historical development of agricultural education, practical agriculture in secondary schools, the school farm facility and practical teaching of agriculture, adequacy of the school farm facilities and level of accessibility to the school farm facilities. The chapter finally concluded with the theoretical and conceptual frameworks which the study was based upon.

2.2 Contribution of Agriculture to the Kenyan Economy

Over the past several decades, the role played by agriculture towards economic prosperity has shifted globally. (Ogemah, 2017) attributes this shift to technological advancements and industrialisation which have placed more focus on the formulation and diffusion of agricultural innovations and technologies with an aim of improving production efficiency. Data from United Nations Food and Agricultural Organization (FAO, 2019) indicates that 38 percent of the global populace was involved in the agricultural sector as at 2018. Projections indicate a rise in the percentage by the year 2030. The report further revealed that besides creation of employment opportunities, agriculture also alleviates hunger, promotes industrialisation through raw material provision and also earns foreign exchange.

In the African continent where most of countries are less industrialized with relatively low advancement in technology, the agriculture sector remains the key source of employment economic growth. Based on a report by (OECD/FAO, 2016), the sector provides up to 60 percent of Gross Domestic Product in most African states. It also creates employment to almost 65-75 percent of the workforce in Africa which is averagely above the global threshold (Mukasa et al., 2017). To the contrary, agricultural potential in Africa remains untapped. This is evident from the fact that FAO (2018), projects that poverty and hunger are to worsen by the year 2030 if proper interventions will not have been put into place. Ekezie (2020) posits that to alleviate poverty and hunger and achieve sustainable development in the African continent, an agriculturally skillful workforce is necessary. Agricultural education in schools can play a pivotal role in averting this looming situation by taking a more practical approach in order to channel out a skilful workforce. Practical teaching of agriculture in schools cannot be achieved without the provision and utilization of the school farm facility which formed the basis of this study.

Kenya, like majority of the other African nations entirely depends on the agriculture sector for economic prosperity. In fact, the blue-print for achieving vision 2030 is exclusively hinged on this sector with an anticipated yearly economic growth of approximately 10 percent. Based on the Republic of Kenya (2017) report, agriculture contributes to 30 percent of the GDP and offers employment opportunities either directly or indirectly to over 80 percent of the national labour force. Based on these statistics, it is evident that the agriculture sector is the key pillar to the Kenyan economy. The Republic of Kenya 2016) report projected that with proper investment in the sector through sagacious earmarking and allocation of resources, the Human Development Index (HDI) of the nation can greatly improve, guaranteeing better living standards for citizens. Furthermore, the country heavily depends on the sector to meet some of her global and regional commitments including the Comprehensive Africa Agricultural Development Programme (CAADP) and Sustainable Development Goals (SDGs) (UNESCO, 2017). The country has a great Agricultural potential which if well tapped can help to steer the nation to a middle-income economy. According to Osongo (2014), Kenya as a country is endowed with a vast agricultural land which is approximately 587,000 km² out of which 576,076km² is arable.

With so much expectations, revitalization of the agriculture sector which has to begin with a change in the manner in which agriculture is implemented in schools is necessary so as to churn out a competent and skilful human resource capable of identifying gaps in the agricultural value chain (Kyule & Konyango, 2019). Despite having a great agricultural potential, much has not been achieved especially in alleviation of poverty and hunger. Kyule and Konyango (2019) attribute this to the theoretical teaching which pays much emphasis on certification and academic excellence at the peril of skill acquisition leading to churning out of graduates unable to fit in the agricultural labour market. Disconnect between the manner in which agriculture curriculum is implemented in Kenyan secondary schools and the labour market needs has proven to be the main hinderance towards practical teaching of the subject.

2.2.1 Current Status of Food Security and Youth Employment in Kenya

Food insecurity is still a menace in Kenya with the nation being ranked 86th out of 113 countries by the International Food Research Policy [IFPRI], (2017). This was confirmed by findings from the Parliamentary Budget office (2018) which revealed that the country has become a major importer of basic food commodities such as maize, milk, wheat, sugar, potatoes, rice and beans. This prompts the government to spend much on food importation

rather than investing in other income generating projects which in turn slows the rate of economic growth (RoK, 2017).

Shortage of skilled workforce in the agriculture sector to effectively make use of the agricultural potential is among the factors contributing towards food insecurity in the country. It is quite ironical that despite having a youthful and literate population, Kenya still heavily relies on hiring foreign labour for implementation of agricultural-based projects with the Galana-Kalalu project being one of the notable examples (Kyule, 2017). Majority of these foreign-based contractors are mainly interested in economic gains thus the projects they initiate hardly materialise. Training of our own students in a practical manner using relevant resources can not only assure the country of a competent workforce in the agriculture sector but can also help the government reduce on the expenditures incurred on hiring foreign expertise. Njura et al. (2020) reiterate that agricultural education in schools should envelope content related to food security as this is deemed as a key indicator of economic growth.

Although it is envisaged that agriculture can help in reducing youth unemployment, it is quite ironical that unemployment rate still remains high. Approximately 64 percent of the rural Kenyan youth are unemployed and completely devoid of any form of vocational skills (KIPRA, 2020; Muma, 2016). With majority of the Kenyan youth enrolling for agriculture at the secondary school level (KNEC, 2019), a practical approach to curriculum implementation by active use of the school farm facilities can help in churning out a skilful workforce capable of fitting in the agricultural value chain. This could curb on youth unemployment thereby contributing to the rapid economic transition of the country into a middle economy within a short time frame.

2.3 Historical Development of Agricultural Education

The concept of school agriculture in Kenya dates back to the year 1873 when it was introduced by the Church Missionary Society (CMS) (Konyango, 2010). In 1926, the subject was introduced at Alliance High School with a documented curriculum being crafted for the first time (King, 1975). In 1931, agriculture was however prematurely dropped due to the much resentment from the Africans. After a 28 year duration, the subject was re-introduced later in the year 1959 by the International Cooperation Agreement (ICA) with the Chavakali vocational school being set up (Stabler, 1969). The following year, Robert Maxwell who was serving as the teacher of agriculture at the Chavakali School documented an agriculture curriculum titled 'Principles and Practices'. In November, 1963, the first cohort of learners from the school did

their examinations, resulting to an 87 percent success rate (GoK, 1970). The Success of this project prompted the Kenyan government to set up six more schools in 1964.

The nature of the agriculture curriculum implemented during the Chavakali pilot project can best be described as what Saeteurn, (2017) refers to as the vocationalisation of secondary school education which entirely aims at steering the curriculum towards a practical direction. The pilot project was aimed at achieving three main objectives which included; giving a hands-on approach to agricultural education in rural schools thereby making the education relevant to the economic needs of the country, culturing a positive attitude towards farming and rural agricultural life among learners, developing demonstration areas in schools (West Virginia University, 1966). These objectives were geared towards nurturing students for agriculture-related occupations (Chepng & Boit, 2015).

To ensure that school agriculture achieved its mission, deliberate efforts were made to create a connection between the syllabi and various school based facilities such as tractors, cultivators and combine harvesters (Konyango & Asienyo, 2015). Kyule (2017) reiterates that during this period, demonstration plots were mandatory for reinforcing the learnt concepts. It is also worth noting that the nature and form of evaluation between this duration which lasted for a 21 year period between the years 1963-1984 gave special consideration to vocational agriculture. The exams were not theory-based but rather practical-based (KNEC, 2004). The vocational agriculture offered at that time not only cultivated a positive outlook of the subject but also enhanced diversification of the curriculum (Konyango & Asienyo, 2015).

Over time after the Chavakali pilot project, there have been different education systems in Kenya, which have impacted on school agriculture in various ways. In 1976, the Gachathi commission report advocated for a more practical oriented education system that would pay more attention to vocational subjects such as agriculture (Ngugi & Muthima, 2017). The 7-4-2-3 education aimed at reducing unemployment through promoting income generating opportunities (Kyule, 2017; Mwiria, 2005). In 1981, the Mackay Commission recommended far reaching changes to the education system from 7-4-2-3 to 8-4-4 (Chepng & Boit, 2015). Kaviti (2018) states that the 8-4-4 system of education had an auspicious start during the roll-out and was anticipated to produce a skilful workforce that was well versed with blue collar jobs. Ambaa (2015) echoes these findings by stating that the 8-4-4 system strongly emphasized attitudinal and skill preparation in readiness for the real world of work beyond the classroom. Agriculture was set to be offered at the primary and secondary level as well as other universities apart from Egerton (Kyule, 2017). This system however failed to offer agriculture in a practical

manner as it had earlier been envisaged partly due to inadequacy of resources and facilities (Brudevold-Newman, 2016).

Due to the failure of the 8-4-4 system of education to live up to its expectations especially with respect to the teaching of vocational subjects such as agriculture, a new education system was quickly formulated to replace it (Kaviti, 2018). This new education system is competence-based and pays much emphasis on skill acquisition. Among other aims of CBE is facilitation of teaching and learning vocational subjects practically, enable learners identify their abilities and reduce on school-dropout rates among learners (Namwambah, 2020). In the CBE, agriculture has been re-introduced at primary schools as an independent and core subject starting from upper primary (Government of Kenya, 2023); Karani et al., 2021). Being resource intensive, the feasibility and sustainability of this education system with reference to provision of relevant facilities such as the school farm remains uncertain.

2.4 Practical Agriculture Education in Secondary Schools

According to Fuseini (2020), practical agriculture entails knowledge and skill acquisition in agriculture with the aim of passing the same onto students who are considered as the prospective future farmers for improved agricultural production. In schools, it goes beyond the classroom and involves laboratory experiments, observations carried out on the school farm, field excursions to agro-based demonstration farms and extensive farm work with the aim of exposing students to real farming experiences that are applicable at work (Bett, 2022). Practical farming skills on the other hand are the psychomotor domain involving hands-on skills to practically carry out various operations especially dealing with farm tools and machinery (Fuseini, 2020). Amadi and Nnodim (2018) argue that these skills sustain the learners after school through encouraging self-reliance, farm productivity and employment creation. Study findings from Chepng and Boit (2015) for instance revealed that farmers having secondary school agricultural skills are in a position to make informed decisions in crop diversification. Experiential learning through practical activities on the school farm provides a base upon which students' inquisitive minds are given a chance to explore.

Education systems in the developed countries pay much emphasis to the practical aspect of agriculture (Jones, 2018). The scholar points out that in these countries, practical agriculture which is basically vocational in nature is regarded as a crucial component of the national curricula for career preparation purposes. Deliberate attempts are therefore made to ensure that agriculture is not only taught within classrooms but also supplemented with practical activities. In china, technical and vocational institutions have undergone tremendous reforms since 1949

with the aim of equipping as many youth as possible with practical skills necessary for economic development (Wang & Guo, 2019). In Taiwan, agricultural education programmes have been strengthened so as to create awareness on such pertinent issues like food security and environmental conservation (Ho et al., 2017). In the USA, farm projects which are also referred to as Supervised Agricultural Experiences (SAE) are conducted on the school farms for a period of not less than six months annually (Roberts & Harlin, 2017). This aims at imparting real farming experiences into the learner in readiness to joining the world of work.

In Kenya, practical agriculture is championed in secondary schools through students' participation in agricultural activities mostly through the Young Farmers Club of Kenya (YFCK) project activities. The YFCK enables students to participate in agricultural activities such as livestock production, crop production, ploughing contests and agricultural field trips (Mugambi et al., 2021). Through such activities, students get an opportunity to apply the agricultural principles and practices learnt in class. The inclusion of a practical examination (443/3), which is project based by KNEC also compels learners to participate in project activities on the school farm (Manyali, 2015).

The agriculture curriculum in Kenyan secondary schools comprises of 33 topics summarily grouped into; Crop and Livestock Production, Farm Structures, Farm Power and Machinery, Agricultural Economics and Agroforestry (Kyule, 2017; Kyule & Konyango, 2019; MoE, 2006). Kyule et al. (2018) argue that school agriculture should not be offered merely for the sake of certification but rather be relevant to the societal needs. Practically oriented agriculture curriculum places the learner in a better position to understand important communal aspects relating to farming such as the agro-ecological conditions of the area as well as identification of the existing gaps and opportunities in the agricultural value chain thus worth being emphasized (Soetan et al., 2021). Practical implementation of agricultural concepts demands the incorporation of a wide range of facilities so as to arouse students' interest (Darko et al., 2016). The study narrowed down at establishing the contribution of the school farm towards practical agriculture in secondary schools.

2.5 The School Farm and Practical Teaching of Agriculture

The criterion for determining quality of education should not only consider academic achievement and certification but also factor in the adequacy and state of facilities (Limon, 2016). (Mlawa, 2018) defines facilities as the school plant which include; school buildings and infrastructures enhance learning. In support of this, Ojuok et al. (2020) outlined that provision and use of proper adequate facilities creates a realistic learning atmosphere and

makes abstract concepts more concrete. Learning takes place when the learner interacts with the environment which in this case refers to the facilities (Ndirangu et al., 2016; Ogweno, 2015). A wide body of knowledge underscores and provides evidence of the relevance of physical facilities in schools (Chonjo, 2018; Wambua et al., 2018).

The school farm is one of the most essential facilities required for the practical teaching of agriculture. Konyango and Asienyo (2015) equate its significance in agriculture to the case of a laboratory in Science subjects. Iderawumi (2020) outlined the objectives of a functional school farm to include; earning income to the school through the sale of surplus produce, attraction centre to school visitors, providing farming practice to the learners, improving background knowledge, solving individual farming problems and carrying out experimentations. With consideration to these outlined objectives, it should be conclusively agreed that it is one of the key requirements towards a hands-on agriculture curriculum implementation. It is specifically within the school farm where students carry out hands-on activities that equips them with skills relevant in the world of work thus its availability is necessary in any school offering the subject (Aholi, 2018).

Iderawumi et al. (2021) defined it as a piece of land within the school compound that has been specifically allocated to students for the purpose of carrying out hands-on activities in both crop and livestock production. The concept of garden-based learning has been well embraced and is predominant as school farms are used as laboratories for hands-on teaching and learning in various subjects such as environmental studies. Various international organizations such as the Food and Agriculture Organization (FAO) are advocating for the utilization of school farms not only for purposes of experiential learning but also addressing the nutritional and dietary needs of teachers and learners (Machisu et al., 2022). Students who have been raised in backgrounds where agriculture is not practised as an economic activity such as urban centres may lack interest in the subject. However, Chukwudum and Ogbuehi (2013), observed that by exposing such learners to the real farming experiences on the school farm, their interest and passion towards the subject improves. Equipping relevant agricultural skills among the agriculture students who are deemed as the future participants in the agricultural value chain demands well planned experiential learning experiences on the school farm.

In Kenya, school farming dates back to the colonial era when the government promoted the practice in rural primary schools through the 4-K clubs which is an acronym from the *Kiswahili* words '*Kuungana, Kufanya, Kusaidia* Kenya, which loosely translates to "get together, act and help Kenya". (Foekan & Owuor, 2017) observed that during this era, school

farming enabled the rural youth to acquire skills in entrepreneurship, modern farming techniques and leadership. The Chavakali pilot project of 1960 proved to be the pinnacle for practical agriculture in Kenyan secondary schools prompting the Kenyan government to roll out the programme to six more schools in the year 1964 (Maxwell, 1965). Documentary evidence from (GoK, 1970) report highlights that it was mandatory for each of the six schools to reserve not less than five acres (2 hectares or 20,000 square metres) of arable land purposely for students' project work. The agriculture offered in the pioneering schools was purely vocational and aimed at churning out a skilful workforce capable of actively participating in the agricultural value chain.

Over time, there have been various educational reforms and policies which have had different impacts on school farming. The Gachathi Commission Report of 1976 for instance formulated the school farm management policy which advocated for farm attachment among learners during holiday sessions as a means of acquainting them to the actual working environment prior to graduation (Government of Kenya, 1976). The 8-4-4 education system whose rollout was done in early 1985 was deemed as the most ultimate panacea to addressing youth unemployment through equipping learners with hands-on skills. Kyule (2017) established that during the initial years of the 8-4-4 system, school farming was prioritised and it was mandatory for every school offering agriculture to reserve a farm for students' project work. This seemed to be an auspicious start as far as the practical implementation of practical agriculture was concerned. However, as years went by, the land policy was gradually dropped, giving a leeway for theoretical teaching of the subject. The aftermath of the situation was evident in channelling out of unskilled workforce incapable of actively participating in agriculture, a situation that further escalated rates of unemployment (Brudevold-Newman, 2016; Konyango & Mutisya 2017). The 8-4-4 is gradually being phased out by the CBE which is anticipated to address the shortcomings of the previous system (Government of Kenya, 2023).

A properly synchronised school farm programme has the potential to improve students' entrepreneurial skills such as record keeping by enabling the learners to put into practical use the abstract concepts acquired in the classroom (Aholi, 2018). Manyasi (2019) affirmed that learners who are actively exposed to school farm activities during tend to be prospective farmers. The study was therefore conducted to establish the availability status of the school farm in secondary schools Malava Sub-County.

2.5.1 School Farm Facilities

Based on the Kenya Institute of Education (KIE, 2006) guidelines, an ideal school farm should have four mandatory sections which include; demonstration plots, commercial plots, museum plots and project plots. Each and every section plays its role in the implementation of practical aspects of agriculture. Demonstration plots provide a site where the teacher demonstrates to the learners the procedure involved in carrying out various routine management practices in crop production such as pruning, mulching, weeding and watering (Waiganjo, 2021). The commercial plot exposes the learners to the economic importance of agriculture thereby enabling learners to perceive the profitability aspect of agriculture. Museum plots are reserved for growing exotic varieties of crops that have been discussed in the syllabus but not commonly grown in the local ecological region. Project plots are reserved for students' project work (Kyule et al., 2016). As the learners interact with each other while carrying out project work on the school farm, they also acquire communication, problem solving and critical thinking skills which based on Karani et al. (2021) are very paramount to the 21st century learner. Farm structures are also an important component of a school farm as they play various roles such as restraining and housing livestock thus crucial in facilitating learners' acquisition of skills in animal husbandry (Bett 2022).

Developed nations such as Finland and the USA have placed more emphasis on practical teaching of agriculture through provision of relevant school farm facilities with the aim of maximising the connection between agricultural practice and education (Muthomi, 2017). According to the (FAO, 2015), the incorporation of gardens as a tool in the hands-on implementation of agricultural curriculum has rapidly gained mileage and thus being included in the national education policies. Despite the zeal and urge shown by the African states, inclusive of Kenya in promoting school farming, Schreinemachers et al. (2019) observed that the educational systems in most of the African states failed to envisage and properly plan on how to implement the program. A study carried out by Cannon (2018) on the teaching of agriculture at the basic education level in developing countries revealed that few teachers used supervised practical on the school farms mainly due to lack of technical know-how and the excessive focus on theoretical agriculture.

The UNESCO (2012) report highlighted shortage of finance as the main obstacle towards management and expansion of facilities in schools. Establishing and maintaining school farm facilities demands for high financial input established that the school farm facilities should be accompanied with farm tools and machinery some of which are costly (Emeya & Ojimba, 2012; Evelia 2014). Purchase of consumable inputs such as fertilizers, agro-

chemicals, seeds and fuel for school farm operations also has a financial implication. Dilapidated farm structures, inadequate farm tools and implements, few and emaciated livestock and generally poorly maintained school farm projects are some of the effects of financial inadequacy on school farm facilities (Iderawumi et al., 2021; Lawal et al., 2014; Onwumere et al., 2016). Shortage of practically trained teachers of agriculture, inadequate time allocation and the paradigm shift towards certification and academic excellence witnessed under the 8-4-4 system of education have further dealt a big blow to the expansion and maintenance of school farm facilities (Konyango & Mutisya 2017; Kyule, 2017; Waiganjo, 2021). This study aimed at establishing the availability status of school farm facilities in secondary schools in Malava Sub-County.

2.6 Adequacy of the School Farm Facilities

The most commonly used variable in establishing the adequacy of facilities in schools is the class size or simply the number of students who the resource or facility is meant to serve during the lesson (Waiganjo et al., 2019). Class size does not refer to the dimensional size of the classroom building but rather, the highest number of learners allowed to be enrolled in that particular class. Teaching effectively takes place when the class size is relatively manageable to the teacher. The recommended student-facility ratio based on the UNESCO standards is 25:1. According to Anekeya (2015), some vital components of the instructional process such as class management, lesson preparation, provision of timely feedback, assessment and evaluation are more likely to be achieved with much ease in situations where class size is averagely small. Figueroa et al. (2016) and Ong'amo et al. (2017) concurred with these findings and further reiterated that a smaller Student- facility ratio enhances skill acquisition especially if the facilities seem scarce since each and every student gets access to the available facilities and resources.

Countries which happen to be members of the Organization for Economic Cooperation and Development (OECD) tend to have made laudable steps in ensuring manageable class sizes. In Finland for example, the average student-teacher ratio is 13:1 which in turn favours practical teaching of resource intensive subjects for skill acquisition. In Africa, teaching of agriculture for skill acquisition is far from reality and this can be directly attributed to the inadequacy and in some situations, the complete absence of necessary school farm facilities. Tapiwa (2021) observed that majority of African countries have tailored their education systems to fully accommodate agriculture as a core subject without first envisaging the adequacy level of fundamental school farm facilities such as project plots. The aftermath of

this policy has been a tremendous increase in class size beyond the average standards which has in turn resulted into inadequacy of these vital school farm facilities. Findings from (UNICEF, 2013) revealed that large class size remains to be the one of the main impediment towards the achievement of quality education in majority of the African countries.

Kenya, like majority of the Sub-Saharan African countries is still grappling with high class size. There have been various factors which have greatly contributed to significant changes in enrolment and provision of educational resources and facilities in schools. Among these factors, increase in human population and educational reforms remain to be the most outstanding (UNICEF, 2013). It is perceived that over time, enrolment trend has been on a rising trajectory thus putting pressure on the available resources and physical facilities. As at January 2012, the Student-Teacher ratio (STR) in secondary schools stood at 41:1 mainly due to the Free Day Secondary Education policy that was implemented in the year 2008 (MoE, 2017; MoEST, 2014). The increase in student enrolment should factor in the level of adequacy of physical facilities for practical education in vocational subjects like agriculture whose holistic implementation demands incorporation of relevant facilities.

Waiganjo et al. (2019) affirmed that an outrageously large class size makes it nearly impossible for the teacher of agriculture to organize learners into sizeable groups during project work on the school farm. Active learner participation in large groups exceeding ten students is not guaranteed. The inadequacy of school farm facilities in secondary schools has been linked to various factors. Evelia (2014) for instance pointed out that the Kenya National Examinations Council (KNEC) guideline requiring every agriculture candidate to be allocated a project plot measuring 12 square metres as part of the summative evaluation contributes to inadequacy of school farm facilities. These projects commence in late January and end in September during which students in the lower classes may not get a portion of the school farm especially in schools with large number of agriculture candidates.

Inappropriate policies from school management have also been observed to contribute to inadequacy of school farm facilities. Konyango and Asienyo (2015) established that in some situations, the principal together with the Board of Management may perceive the school farm as an income generating unit thus allocating a larger portion for commercial purposes while snubbing other critical facilities such as project, museum and demonstration plots. This may undermine the vision of school agriculture of equipping learners with hands-on skills. This study aimed at establishing the existing relationship between level of adequacy of school farm facilities and the level of agricultural skill acquisition among secondary school students in Malava Sub-County.

2.7 Level of Accessibility of the School Farm Facilities

Education in the 21st century is rapidly shifting from the conventional teacher-centred pedagogies to the modern student-centred ones which aims at individualizing instruction. In the current approach, the teacher serves as a facilitator rather than the main source of knowledge while on the other hand, the learners explore and search for knowledge from various sources under the guidance of the teacher (Waiganjo & Waweru, 2018). Ong'amo et al. (2017) attenuates that learning takes place better when learners are presented with concepts in a sequential manner from concrete to abstract. The integration of facilities during the instructional process helps achieve this objective by making the learning process begin from known to unknown. The agriculture concepts tend to be interconnected right from form one to form four thus Waiganjo (2021) established that effective use of the relevant facilities such as the school farm can help the learner to clearly understand these concepts and develop a more positive outlook of the subject.

Agriculture is considered as a vocational subject and for this reason, Kyule et al. (2016) suggested that the implementation of the subject demands for a project- based approach to enable the learners acquire technical skills. Besides agricultural skill acquisition, there are numerous other benefits associated to engaging students on the school far. Nancy et al. (2017) ascertained that through project work on the school farm, learners improve on their cooperation and collaboration abilities which in turn promotes communication and inter-personal relations. Critical thinking, creativity, problem solving and higher content retention have also been linked to active engagement of learners in project work on the school farm. It is in line with these benefits that Soetan et al. (2021) recommended that a skilfully oriented teacher who teaches agriculture with an aim of channelling out a skilful workforce should make deliberate efforts to not only to ensure availability of school farm facilities but also facilitate students' access to the same facilities.

During the Chavakali pilot project, the objective of preparing a skilful workforce for the agriculture sector was achieved through promoting students' access to the school farm. Kyule (2017) attests that during this era, the school had a viable farm with operational project and demonstration plots that were fully accessible to the learners with minimal restrictions. The learners were required to establish agricultural projects accompanied with a properly updated diary for recording the progress, challenges and solutions encountered. Besides school farming, it was mandatory for the students to set up demonstration plots back at their respective homes so as to replicate concepts learnt at school and also enable them have a better understanding of their local agro-ecological conditions. Saeturn (2017) established that the

frequent access to farms both at school and home not only equipped these learners with practical farming skills but also placed them in a better position to disseminate modern farming techniques to their relatives and the general community at large. This proved to be one of the key contributing factors towards the success of the pilot project as it not only enabled the learners to perceive the profitability of agriculture but the general community as well.

Adoption of the 8-4-4 education system came with some policies that had profound impacts on level of access to school farm facilities. Double lessons in agriculture were scrapped off with lesson time being limited to forty minutes (Evelia 2014; KIE, 2006; Kyule, 2017). The agriculture syllabus was also expanded to 33 topics broadly categorized into; livestock production, crop production, agricultural economics and farm power and machinery distributed across the four-year study period (KIE, 2006). At the end of each and every topic, there are suggested learning activities. Table 3 presents a summary of these suggested learning activities which are supposed to be conducted on the school farm under guidance of the teacher of agriculture.

Table 3

Summary of Suggested Projects at Various Classes

Form	Suggested Projects and Practical Activities
One	Growing of crops through irrigation, compost manure preparation, identification and use of farm tools and equipment and identification of livestock breeds
Two	Selection and preparation of planting materials, nursery bed preparation, grafting fruit trees, conducting field practices in crop production, growing a selected vegetable crop from nursery establishment to harvesting stage, disease control measures in livestock production and identification and control of various livestock parasites
Three	Conduct livestock rearing practices, construction and maintenance of farm structures, soil erosion control measures, designing and construction of micro-catchments, pest and disease control measures, cultivation of selected field crops, livestock care and handling techniques and selection of breeding stock

Source: KIE Agriculture Syllabus (2006)

Past studies have generally revealed low levels of access to school farm facilities. Findings from Kyule (2017) established that only a paltry 2.3 percent of learners in the ASAL regions of Baringo, Makueni and Narok had access to the school farm. Another study by Evelia

(2014) highlighted that proximity to the school farm facilities influences level of access. (Otieno & Deya, 2018) and Iderawumi et al. (2021) established that accessibility to the school farm is influenced by school administrative policies. Although the agriculture syllabi at different classes clearly outlines the nature of practical activities to be conducted as outlined in Table 3. It is however oblivious whether all the students of agriculture in Malava Sub-County access the school farm for these activities and suggested projects. To fill this research gap, this study established the level of accessibility and the frequency of utilization of the school farm facility among agriculture students.

2.8 Theoretical Framework

This study was pegged on the Pragmatic Theory postulated by John Dewey in 1908. This theory advocates for learning by doing and suggests that learning should be practical rather than theoretical. According to this theory, teachers as the curriculum implementers should strive to expose the learner to real life experiences which according to (Elias, 2004) awaits the learner after graduation. The theory was relevant to the study since a pragmatic approach to the teaching of agriculture through actively engaging the learners on the school farm enhances their level of agricultural skill acquisition thus preparing them for future careers in the agriculture sector.

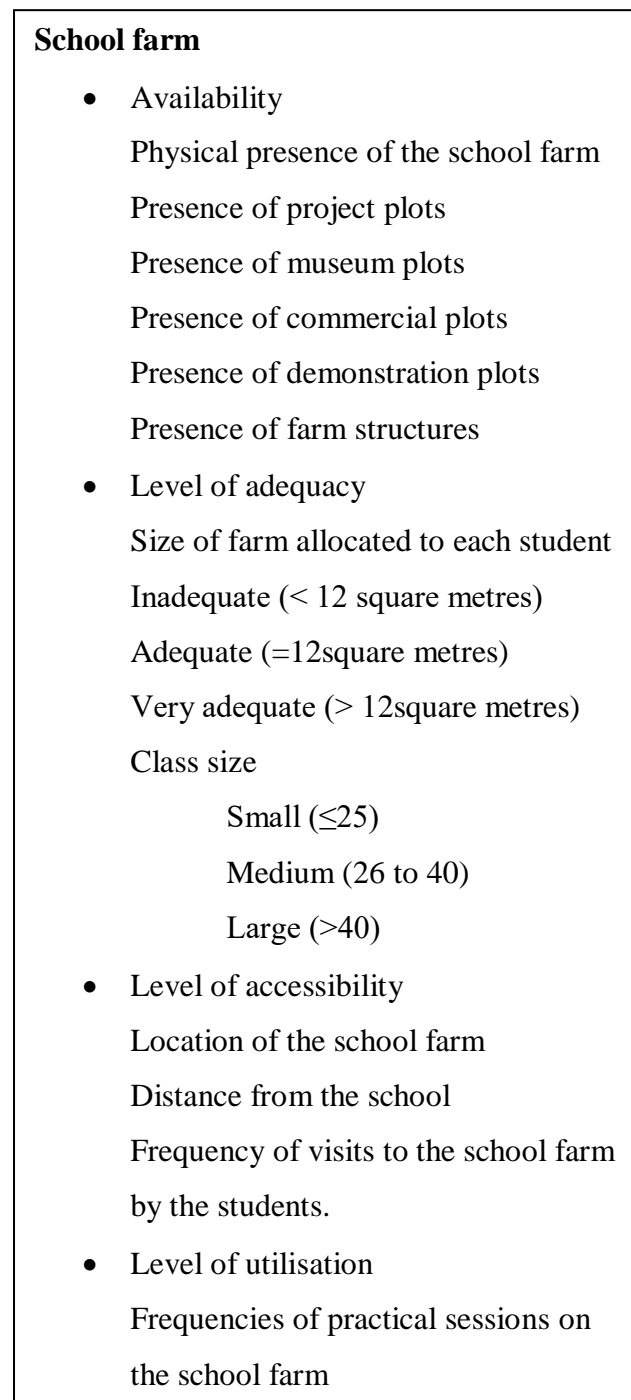
The second theory that guided this study was the Constructivist Learning Theory that theorized by Mascolo & Fischer (2005). According to this theory, allowing learners to interact with a variety of learning materials places them in a better position to make discovery of the real world by themselves which basically constitutes experiential learning. This theory was deemed relevant to the study because the interaction between the learner and school farm facilities exposes the learners to the real world experiences of work in the agriculture sector.

2.9 Conceptual Framework

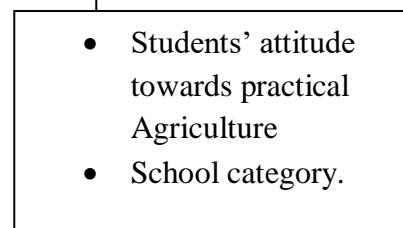
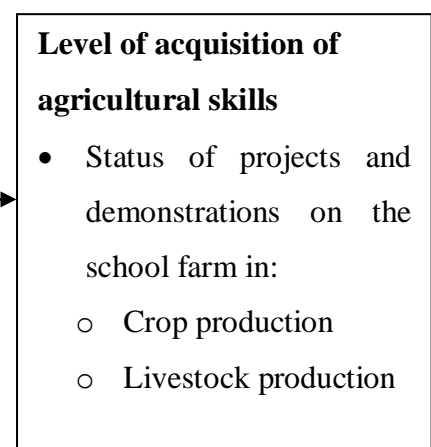
The study focused on the relationship between school farm factors and the acquisition of agricultural skills among secondary school agriculture students in Malava Sub-County. Figure 1 shows variables under study. The independent variable is school farm factors and was measured in terms of availability, level of accessibility, level of adequacy and level of utilization of the school farm facility. Availability was measured in terms of the physical presence of a school farm as well as the sections on the school farm such as the project plots, commercial plot, demonstration plots, museum plots and farm structures. Level of accessibility was measured in terms of the location of the school farm, the distance from the school and the frequency of visits to the school farm by the students. Level of adequacy was measured in

terms of class size in relation to the average size of the school farm facility in square metres allocated to each student. Level of utilization was measured in terms of frequencies of practical sessions on the school farm. The dependent variable which is acquisition of agricultural skills was measured in terms of the status of the demonstrations and projects in both crop and livestock production on the school farm. Moderator variables influence the effects of the independent variable on the dependent variable. For this study, one of the moderator variables was attitude of agriculture students where a student may not be interested in applying the theoretical aspects of the subject. This moderator variable was controlled through random sampling of the students. The use of form three agriculture students also controlled this variable since at this level, the students have already done subject selection and therefore have a better understanding of the practical aspect of agriculture. School category was the other moderator variable whereby students in different school categories may have varying levels of exposure to the school farm during the practical teaching of agriculture for acquisition of practical farming skills. This was controlled through inclusion of different categories of schools in the study. Figure 1 presents the interaction between the variables under study.

Independent Variables



Dependent Variable



Moderator variables

Figure 1: Relationship between School Farm Factors and Level of Acquisition of Agricultural Skills

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter was divided into the following sub-sections; research design, location of the study, sample size and sampling procedure, target population, instrumentation, data collection procedure, data analysis and finally concluded with ethical considerations.

3.2 Research Design

This study relied on correlational Research Design. The design makes it feasible to determine existence of any form of relationship among two or more variables under study. Edmonds and Kennedy (2016) recommended this design to education-related studies as it makes it possible to establish the association among multiple variables in a study independently. The design also makes it possible for the researcher to ascertain the nature and degree of magnitude existing amongst the various variables being studied (Cohen et al., 2018; Curtis et al., 2016). The design was therefore deemed applicable to the study as it enabled the researcher to establish the degree to which multiple school farm factors; availability, adequacy, accessibility and level of utilisation correlate with level of acquisition of practical agricultural skills among the form three students of agriculture.

3.3 Location of the Study

This study was undertaken in secondary schools in Malava Sub-County, Kakamega County, Kenya. The study location covers an area of about 427.40 Km² of which 391.00 Km² is arable land. Geographically, the area lies at latitude 0⁰ 26'N and longitude 34⁰ 5" E. The Sub-County comprises of seven wards which include; Butali-Chegulo, East Kabras, South Kabras, Manda Shivanga, Shirugu-Mugai, Chimuche and West Kabras. The Sub-County had a total population of 280,132 based on the 2019 census (Kenya National Bureau of Statistics, 2020). Average annual rainfall ranges from 1300mm to 1900mm per year. Eighty percent (80%) of the residents rely on farming as a source of livelihood. Austerity levels are still significant due to farmers' ignorance, traditions and cultures which tends to lower adoption rates of modern farming technologies (Kinyangi, 2014). There are two sugar factories in the Sub-County which are Butali Sugar Company located in Butali- Chegulo ward and West Kenya Sugar Company located in East Kabras ward. Apart from sugarcane farming, the soils and climatic conditions favour growing of other crops such as maize, sweet potatoes, cassava on a subsistence basis. (Akenga et al, 2014). Poultry keeping, dairy and beef farming are also common on a small-scale basis. This study area was selected since besides agriculture being

the main economic activity in the area, all secondary schools offer agriculture and the enrolment trend in the subject has been on the rise over the past years.

3.4 Target Population

Refers to the population to which the researcher wishes to generalize the findings of a study while accessible population refers to the portion of the target population that the researcher can access (Matula et al., 2018). In this particular study, target population consisted of 1532 secondary school teachers as well as 4327 form three students from the total 50 secondary schools (Malava Sub-County Education Office, 2019). Out of the target population, the study purposively narrowed down to 171 teachers of agriculture and 2532 form three students of agriculture who formed the accessible population. Purposive sampling enabled the researcher to narrow down to respondents who were deemed fit to provide information regarding school farm factors. Secondary schools were targeted since agriculture is implemented independently with various suggested projects and demonstrations at the end of each topic and therefore, the use of the school farm facility for acquisition of practical farming skills is crucial. Teachers of agriculture were targeted for this study because they have in-depth knowledge on all aspects of agriculture subject, including factors related to the school farm facility that contribute to practical teaching of the subject. Form three students of agriculture were selected because they have already done subject selection and have also covered a considerable number of practical topics in agriculture.

3.5 Sample Size and Sampling Procedure

The school was the sampling unit. There are 50 public secondary schools in Malava Sub-County. To determine number of schools to take part in this study, the formula recommended by Nassiuma, (2000) was used. Based on this formula, 15 schools were sampled.

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

Whereby

n= The required sample size (number of schools)

N= total population (50)

C= Coefficient of Variation (0.2)

e= margin error (0.05)

$$n = \frac{50 \times 0.2^2}{0.2^2 + (50-1)0.05^2}$$

n=15

The schools were then put into their respective categories which include; Sub-County, County, Extra-County and National categories. Based on records from the Malava Sub-County Education Office (2019), there are 5 Extra-County, 13 County and 32 Sub-County secondary schools. There doesn't exist any National school in the Sub-County. The proportional sampling formula by Salkind (2014) determined the number of schools required from each category to participate in this study.

$$n_h = n \frac{N_h}{N}$$

Where;

n_h = Number of schools required from each school category

n = The required number of schools (15)

N_h = Total number of schools belonging to a particular school category

N = Total number of schools (50)

Based on this formula, 9 Sub-County, 4 County and 2 Extra- County schools were selected through Stratified Random Sampling. This ensured equal representation of all categories of schools so as to avoid bias. Stratification of schools was done with the aim of establishing the impact of the moderator variable. Out of the target population, the study purposively narrowed down to 171 teachers of agriculture and 2532 form three students of agriculture who formed the accessible population. The formula by Yamane (1967) was used to establish the required students' sample size.

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

Whereby;

n = Required sample size

N = Population size (2532 form three students of agriculture)

Allowable error = (0.08)

$$n = \frac{2532}{1 + 2532(0.08^2)}$$

$$n = 150$$

To cater for non-response, a sample size needs to be raised by at least ten percent (Mugenda & Mugenda, 2003). It is in line with this recommendation that 15 more students were included. Therefore, a total of 165 students from the 15 schools were sampled. The total number of form three students of agriculture from every school participating in the study was first determined. Through proportionate sampling, the school having the highest student enrolment in agriculture contributed the highest population in the sample size.

One teacher of agriculture was sampled purposively from each of the 15 selected schools. For schools having several teachers of agriculture, the teacher with more years of experience was the most preferred. Teacher with more experience in teaching agriculture was selected due to the vast experience in the organization and utilization of the school farm. This gave a total of 180 respondents. Table 4 presents a summary of the distribution of respondents on the basis of school category.

Table 4

Distribution of Sample on the Basis of School Category

Category of school	Number of schools	Schools sampled	Students sampled	Teachers sampled
Extra-County	5	2	22	2
County	13	4	44	4
Sub-County	32	9	99	9
Total	50	15	165	15

Source: Malava Sub-County Education Office (2019)

3.6 Instrumentation

Questionnaires and an observation guide were the instruments used for data collection. Under guidance from the university supervisors, the researcher developed these instruments. Two sets of self-administered questionnaires were employed to gather information from the two sets of respondents. The questionnaire for the students of agriculture formed appendix A and comprised of six sections labelled A, B, C, D, E and F. Each of the sections collected data required pertaining to the different objectives under study. The section A solicited data pertaining to the demographic aspects of the respondents. Section B solicited data pertaining to the availability status of the school farm facilities. Section C gathered data pertaining to the level of accessibility of the school farm. Section D solicited information on the adequacy level of the school farm facilities while section E solicited information related to utilization of the school farm facilities. Section F dealt with the dependent variable which is acquisition of practical agricultural skills. Just like the students' questionnaire, the teachers' questionnaire also comprised of six sections labelled A, B, C, D, E and F. Each of the sections collected data required pertaining to the different objectives under study. The section A solicited data pertaining to the demographic aspects of the respondents. Section B solicited data pertaining to the availability status of the school farm facilities. Section C gathered data pertaining to the

level of accessibility of the school farm. Section D solicited information on the adequacy level of the school farm facilities while section E solicited information related to utilization of the school farm facilities. Section F dealt with the dependent variable which was acquisition of practical agricultural skills. The observation guide solicited information pertaining to the availability status of school farm facilities as well as the status of projects in the farms in the sampled schools. The instruments were structured to contain both open-ended and closed-ended items in order to encompass aspects of the variables under study.

3.6.1 Validity

It deals with the extent to which various measures of a concept accurately represent it (Mohajan, 2017). Aspects of content and face validity of the data collection tools were estimated by experts from Egerton and Kirinyaga Universities. Content validity was determined through cross-examining the items in the questionnaires to ensure that they resonate with the objectives. Removal of irrelevant items, use of simple English, proper spacing and legible fonts were instrumental improving face validity of the instruments.

3.6.2 Reliability

The capability of a data collection tool to give almost same results after severally being subjected to different respondents (Kumar, 2019). To determine reliability of the instruments to for data collection, a pilot study was first conducted in Khwisero Sub-County. The sample size for the pilot study comprised of five teachers of agriculture and 50 form three students of agriculture. The sample sizes were in line with Kumar (2019) who proposed that the ideal sample size for a pilot study should neither be less than 10 percent nor exceed 30 percent of the actual sample size under study. Among the other 11 Sub-Counties, Khwisero was the most preferred since it has same features as Malava. Through the pilot study, shortcomings of the data collection tools was addressed prior to drafting them for the actual data collection exercise. Cronbach's Alpha coefficient was preferred in estimating the reliability of the tools as it only needs to be administered once and also suitable for likert type items. The teachers' instruments yielded a Cronbach's Alpha value of 0.89 while that of the students had 0.72. This was above the minimum threshold value of 0.7 thus the instruments were deemed suitable for data collection.

3.7 Data Collection Procedure

The process began with the researcher obtaining an introductory letter from the Board of Post-Graduate Studies and ethical clearance letter from the ethics review committee of

Egerton University (Appendices E and F). These made it possible for the researcher to acquire an authorization letter to undertake research from the National Commission for Science, Technology and Innovation (NACOSTI) (Appendix G). The research permit enabled the researcher to acquire an authorization letter from the Kakamega County Director of Education (CDE) (Appendix H). The authorization letter from the CDE made it possible to acquire another authorization letter from the Malava Sub-County Director of Education (SCDE). In schools, permission to solicit information from both sets of respondents was first sought from the principal. The questionnaires were hand delivered giving the researcher an opportunity for self-introduction and explanation of the scope of the study. To minimize on interference from other students, the sampled students were isolated from the rest then given the questionnaires. A 30 minutes duration was given to the respondents to enable them read and fill the questionnaires after which the researcher collected them back. The researcher then counter-checked through each questionnaire to ensure that all items are filled. The researcher also visited the school farm to check on the facilities as well as the form three agriculture classes to check on class size and recorded the observations on the observation guide.

3.8 Data Analysis

Editing and cleaning of the primary data was done first. Coding of the responses through preparation of a codebook was then done to make summary of the analysis possible. SPSS version 26 was employed for the data analysis with the analysed data being presented using tables and frequency distribution tables. The inferential statistic method employed in determining the relationship existing among the variables under study was the Chi-square test for relationship at 0.05 level of significance. Likert values were converted into categorical and continuous data for analysis purposes. A summary of data analysis was presented in Table 5.

Table 5

Data Analysis Summary

Research hypotheses	Independent variable	Dependent variable	Statistical Method
There is no statistically significant relationship between the availability of the school farm and the acquisition of agricultural skills among secondary school agriculture students in Malava Sub-County	Availability of the school farm	Level of acquisition of agricultural skills	Chi-square test for relationship

There is no statistically significant relationship between the level of accessibility to the school farm and the acquisition of agricultural skills among secondary school agriculture students in Malava Sub-County	Level of accessibility to the school farm	Level of acquisition of agricultural skills	Chi-square test for relationship
There is no statistically significant relationship between the level of adequacy of the school farm and the acquisition of agricultural skills among secondary school agriculture students in Malava Sub-County	Level of adequacy of the school farm	Level of acquisition of agricultural skills	Chi-square test for relationship
There is no statistically significant relationship between the level of utilization of the school farm and the acquisition of agricultural skills among secondary school Agriculture students in Malava Sub-County	Level of utilization of the school farm	Level of acquisition of agricultural skills	Chi-square test for relationship

3.9 Ethical Considerations

According to Kumar (2019), the researcher should carefully assess the likelihood of any physical, psychological or emotional harm to the respondents during the research period and find possible mitigation measures towards the same. The researcher began by stating the importance of the research. Since the research dealt with students, some who are below the age of 18 years, anonymity and confidentiality were highly observed. The anonymity was achieved by ensuring that the respondents did not indicate any form of identification on the questionnaires. Confidentiality was achieved by not exposing the filled questionnaires to any other individual besides the researcher himself then afterwards destroying the questionnaires after coding and data analysis.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents analysed data and discussions under the following sub-topics; response rate, demographic information of the respondents, availability of the school farm in secondary schools, level of access to the school farm, level of adequacy of the school farm, utilization of the school farm and acquisition of agricultural skills. Chi-square test for relationship was employed as the inferential statistical tool. Data presentation was done in form of percentages, means, standard deviations and means.

4.2 Response Rate

The study achieved a 100 percent response rate as all the administered questionnaires were successfully filled and returned ensuring a desirable sample size. Kumar (2019) attested that in order to ensure a successful study, researchers should make necessary efforts during research to minimise on incidences of non-response and avoid any bias during sampling and administration of the questionnaires. Hand delivery of the questionnaires resulted to the 100 percent response rate. Various scholars have recommended various minimum response rates for a study. Kumar (2019) recommended a minimum of 80%, (Mohajan, 2017) recommended 70% while Edmonds and Kennedy (2016) recommended a minimum of 60%. The fact that this study achieved 100 percent response rate affirms substantial reliability and validity of the findings.

4.3 Demographic Information of the Respondents

To avoid bias, respondents should vary in terms of demographic characteristics such as age, gender and academic qualification. Demographic information of the respondents was discussed in sub sections 4.3.1 and 4.3.2.

4.3.1 Form Three Students of Agriculture

Figure 2 presents the distribution of the form three students of agriculture by gender.

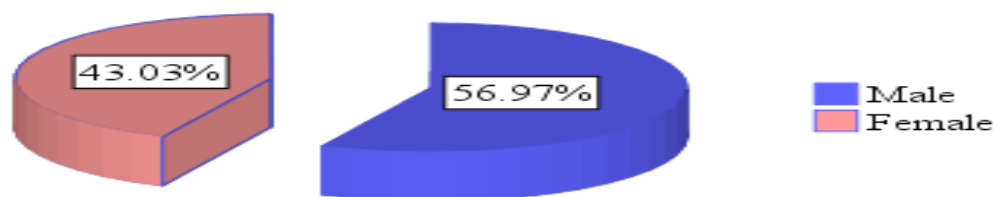


Figure 2: Form Three Agriculture Students Distribution based on Gender

Based on the results, most of the students (56.97%) were male with the minority (43.03%) being female. These findings resonate with those from Kyule (2017) which also revealed male superiority in enrolment into the subject in schools found in the ASAL regions. Research findings from Kinyangi (2014) on the involvement in the agriculture value chain within Malava Sub-County revealed male dominance at 72.2% while the females lagged behind at 27.8%. This might positively impact on agricultural development in the Sub-County as most of the men who coincidentally happen to be the main labourers on farms as well as in the agro-based industries are beneficiaries of practical agricultural education in secondary schools. Ongang'a (2016) points out that during subject selection, few females than males tend to opt for the subject with the perception that the subject is considered more masculine.

The schools were put into their respective cadres. Table 6 presents a summary of school categorisation.

Table 6

School Category Sampling Frame

School category	Frequency	Percent
Extra-County	22	13.3
County	44	26.7
Sub-County	99	60
Total	165	100

As evident from Table 6, majority of the students (60%) were drawn from the Sub-County schools. Those from the County schools constituted 26.67 percent and only a paltry 13.3 percent were drawn from the Extra-County schools. The high percentage of students from the Sub-County schools can be attributed to the Free Day Secondary Education (FDSE) policy of 2008 which was formulated to cater for increased demand for education (MoE, 2017). Upon enforcing this policy, a large number of learners transitioned from primary to secondary schools. The aftermath was mushrooming of secondary schools; majority belonging to the Sub-County cadre. By virtue having most schools belonging to this category, it was automatic that most of the respondents had to be drawn from these schools through proportionate sampling.

To determine the effect of moderator variable (School category) on the dependent and independent variables, selected school farm factors likely to be affected were analysed. Table 7 presents a summary of the findings.

Table 7*Influence of School Category on Levels of Access and Utilization of the School Farm*

Item	School category											
	Sub-County				County				Extra-County			
	N	Min	Max	Mean	N	Min	Max	Mean	N	Min	Max	Mean
Access during weekends	99	1.0	2.0	1.737	44	3.0	5.0	3.909	22	3.0	5.0	4.273
Access during mornings	99	1.0	1.0	1.000	44	1.0	1.0	1.000	22	1.0	1.0	1.000
Access during evenings	99	1.0	4.0	2.303	44	3.0	4.0	3.568	22	3.0	4.0	3.865
Utilization on weekends	99	1.0	2.0	1.303	44	1.0	4.0	2.318	22	2.0	5.0	3.136
Utilization in the morning	99	1.0	1.0	1.000	44	1.0	1.0	1.000	22	1.0	1.0	1.000
Utilization in the evening	99	1.0	2.0	1.212	44	1.0	4.0	2.364	22	3.0	5.0	3.545

As presented in Table 7, 99 students were drawn from the Sub-County, 44 from County and 22 from Extra-County schools. This gave a total sample size of 165. A scale for measuring the degree to which levels of access and utilization of the school farm for purposes of skill acquisition among the form three students of agriculture was being impacted upon by the moderator variable was formulated by the researcher. The rating scale was designed such that any item that scored within the range of 1.0-1.5 was rated as very low, that within 1.6-2.4 was rated as low, 2.5-3.3 was rated as moderate, 3.4- 4.2 was rated as high while that within 4.3-5.0 range was rated as very high. Access level to the school farm during weekends had a low rating mean score in the Sub-County schools at 1.737, for the county schools, it was rated as high at 3.909 while for the Extra-County schools, it was rated as very high at 4.273. Level of access and utilization during morning sessions had a very low mean score of 1.000 among all the three school categories.

With respect to utilization of the school farm during, the stated sessions, the students in Sub-County schools had a relatively lower mean than their counterparts in the other two school categories. The reason contributing to this trend is that most of the schools belonging to this

category are pure day schools and therefore the learners have low chances of being in the school vicinity on weekends. With the case of Extra-County and County schools which are either pure boarding or day/boarding, students, always have much free time on Saturdays and Sundays which they use to visit the school farm either for carrying out practical agricultural activities or monitor their projects. Students in Sub-County schools also tend to have limited access to the school farm during evening sessions in comparison to their counterparts in county and Extra-County schools. By virtue of not being in a position to frequently access and utilize the school farm during these extra sessions, the learners in Sub-County schools may be disadvantaged in terms of acquisition of agricultural skills.

The study further probed to determine the impact of school category on adequacy level of school farm facilities. The findings were analysed and presented in Table 8.

Table 8

Influence of School Category on Level of Adequacy and Availability Status of School Farm Facilities

Facility	School Category											
	Sub-County				County				Extra-County			
	N	Min	Max	Mean	N	Min	Max	Mean	N	Min	Max	Mean
Museum	99	1.0	1.0	1.000	44	1.0	2.0	1.273	22	1.0	2.0	1.520
Plots												
Commercial Farm	99	1.0	2.0	1.231	44	2.0	3.0	2.571	22	2.0	3.0	2.675
Project Plots	99	1.0	2.0	1.493	44	2.0	3.0	2.432	22	2.0	3.0	2.502
Demonstrati on Plots	99	1.0	2.0	1.111	44	1.0	2.0	1.685	22	1.0	2.0	1.563
Availability status of school farm	99	1.0	2.0	1.009	44	1.0	2.0	1.532	22	1.0	2.0	2.321

A rating scale for measuring the degree to which level of adequacy of the school farm facilities was being affected by the moderator variable was formulated by the researcher. Any item that scored a mean between 1-1.5 was categorized as low, 1.6-2.4 as moderate and 2.5-3.0 as high. Among all the types of school farm facilities, Museum plots generally had a low mean score across all the three types of school categories. Project plots and demonstration plots

in Sub-County schools had a mean score of 1.493 and 1.111 respectively which was rated as low. These findings resonate with those from Waiganjo (2021) which established that large class sizes in agriculture due to a few other optional technical subjects directly contributes to inadequacy of instructional resources and facilities. Levels of adequacy of project and demonstration plots in the County and Extra-County schools had a moderate mean score due to relatively smaller class sizes in agriculture due to a wide range of technical subjects to select from during subject selection.

With respect to the adequacy level of the commercial farm, Extra-County schools as well as the County schools had high mean scores of 2.675 and 2.571 respectively. To the contrary, Schools belonging to the Sub-county cadre had a low mean score of 1.231. Since most Extra-County and County schools are boarding schools, the school management deems it fit to reserve most of the school farm for commercial purposes with the aim of producing food to the learners at minimal costs. On the other hand, most of the Sub-County Schools are day schools and therefore not much obliged to meeting the dietary needs of the learners. Regarding availability status of the school farm facilities, all the three school categories had school farms but lacking some crucial facilities thus the mean score was low. This depicts the excessive focus on theoretical aspects at the expense of practical teaching of agriculture for skill acquisition.

4.3.2 Demographic Characteristics of Agriculture Teachers

A total of 15 teachers of agriculture were involved in this study. Figure 3 presents a summary of their distribution on the basis of gender.

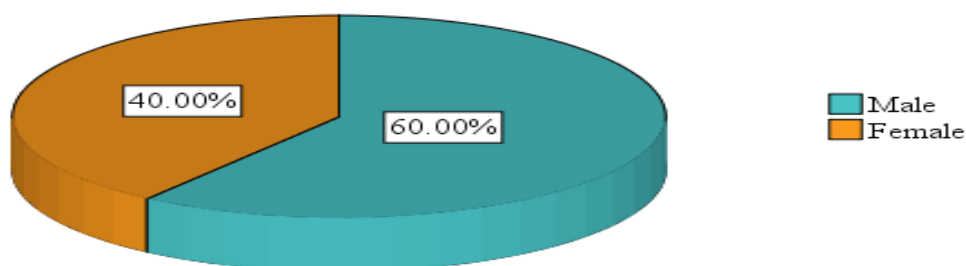


Figure 3: Teachers’ distribution based on Gender

Based on the findings as presented in Figure 3, male teachers were the majority (60%) with their female counterparts forming the minority (40%). These findings are in consonance with those from Mwikali (2018) which attributed the low preference of the subject among female teachers to its vocational nature which demands for more practical activities outside the classroom. Kyule et al (2016) observed the same trend and pointed out that it could have

negative impact on the female students by denying them role models to emulate in the agriculture sector.

The age range of the teachers of agriculture was 25 to 53 years. The mean average age was 36 years. Summary of analysed data on teachers' distribution based on age was presented in Figure 4.

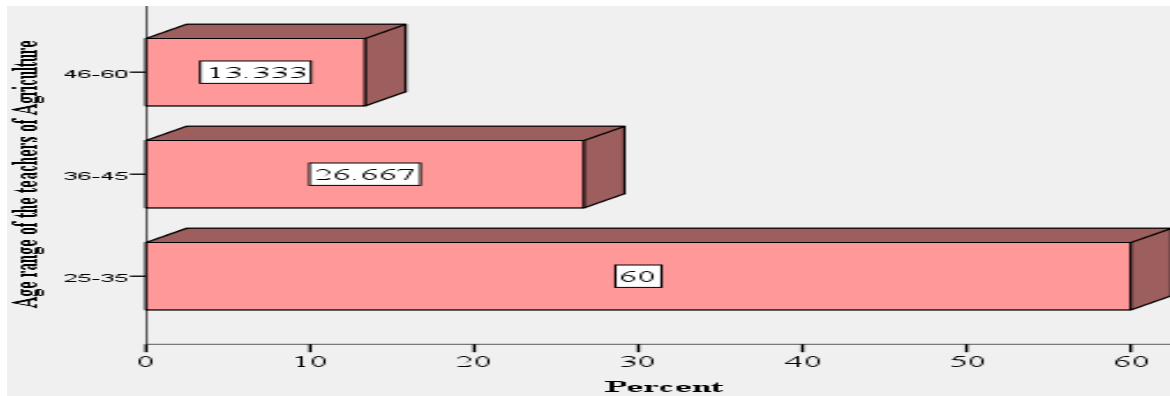


Figure 4: Distribution of Teachers on Age Basis

As evident in Figure 4, majority (60%) of the teachers of agriculture were within the age range of 25-35 years and therefore likely to be new recruits. These findings resonate with those from Waiganjo (2021) where majority of the teachers of agriculture (37.1%) were within the age range of 20-30 years. This is a clear indication that teaching of secondary school agriculture in Kenya rests on the shoulders of young teachers. Though these youthful teachers tend to be short of experience, Eck et al. (2019) point out that they are enthusiastic, full of vigour, affable to learners and therefore likely to be more productive. It is therefore anticipated that these teachers should be better placed to practically implement the agriculture curriculum by using the school farm. The older teachers the 40-60 year range mentor youthful teachers which according to Waiganjo (2021), helps the novice teachers to gradually gain confidence and teaching experience which are vital aspects in the implementation of practical agriculture.

The teachers were selected from the three different school categories in Malava Sub-County. Figure 5 presents a summary of teachers' distribution based on category of school.

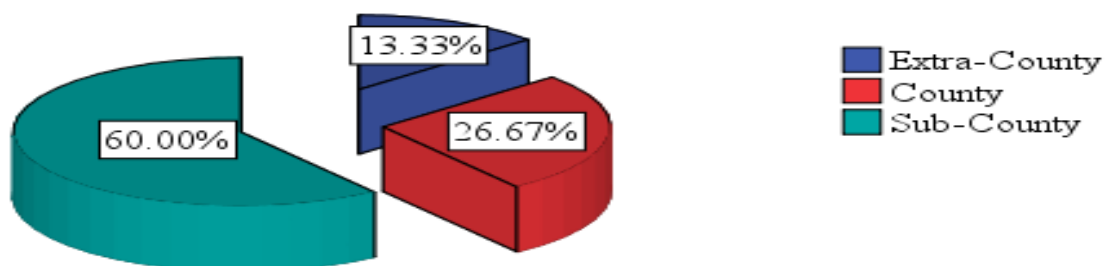


Figure 5: Teacher Distribution on the basis of School Category

As summarised in Figure 5, Sub-county schools contributed the largest sample (60%). This is expected since majority of schools in Malava Sub-County belong to this category. The other two school categories contributed 40%. An enrolment of 2532 students against 171 teachers gives an approximate STR of 15:1. Besides teaching form three students, teachers of agriculture also carry out curriculum implementation in other classes. This translates to a higher STR beyond the recommended international standard of 25:1. Being vocational in nature, agriculture entails many out of classroom activities that the teacher must take the learners through such as monitoring the KNEC project work on the school farm. Such high STR literally translates to high workloads which according to Mwaniki et al. (2022) leaves the teachers time-constrained to the subject in a holistic manner as the syllabus recommends. These findings resonate with those from Waiganjo (2021) which established that high STR especially in Sub-County schools hinders the implementation of practical aspects of agriculture.

The teachers were asked to tick against their current academic qualifications. The analysed findings have been presented in Figure 6.

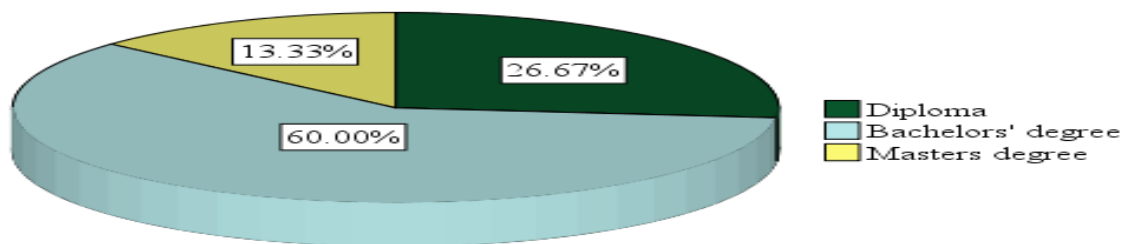


Figure 6: Agriculture Teachers’ Academic Qualification

The recent changes in the Teacher Education and Training that saw the scrapping off of parallel and diploma courses in universities has seen a decline in teachers with diploma in secondary schools. Akala (2021) points out that based on these changes, the minimum entry grade for a teacher trainee to the university is a C plus (C+) with a similar grade in the two teaching subjects. Students who fail to attain these qualifications but interested in pursuing a teaching career have to join Teacher Training Colleges where they attain a diploma that enables them to become primary school teachers.

Teacher Professional Development is an important aspect as far as curriculum implementation is concerned. Research findings from Akala (2021) revealed that teachers who have higher academic qualifications such as masters’ degree are better placed to decipher the right combination of teaching approaches to employ during the instructional process. This can prove to be beneficial in the practical implementation of the agriculture curriculum owing to

its vocational nature which demands a more practical approach. From these findings however, a paltry 13.33% of the teachers had a masters' degree which denotes that most teachers of agriculture have not furthered their studies beyond the bachelors' degree and therefore likely teach most practical aspects of the subject in a perfunctory way.

Teaching experience is considered as a crucial aspect in agricultural education as it is a key determinant of teacher effectiveness. Teaching experience was organized into three groups which included; less than one year, 1-5 years and more than 5 years. Teacher respondents were then asked to tick against their teaching experience. Figure 7 presents a summary of the data analysis.

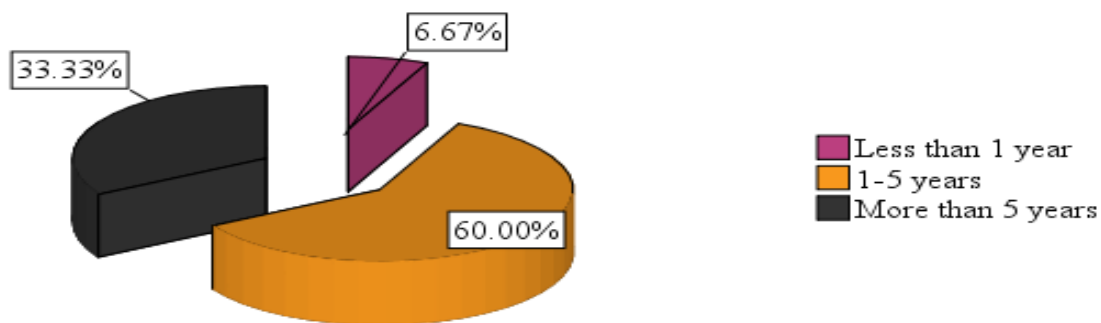


Figure 7: Teaching Experience of the Teachers of Agriculture

Based on these findings, majority of the respondents (93.33%) had more than one year of teaching experience thus were better placed to implement the agriculture curriculum in a holistic manner as recommended in the syllabi. Shikanga et al. (2022) established that teaching quality improves with teacher experience. The teachers with less than 1 year of teaching experience may have difficulty in implementing the practical aspects of the subject. Lavonen (2018) established that this can be improved through in-service training. In service training enhances teachers' pedagogical skills by exposing them to emerging trends in various aspects of curriculum implementation such as utilization of facilities and resources for instructional purposes.

Terms of employment of the teacher is a crucial factor in the implementation of practical aspects of any subject curriculum, inclusive of agriculture. Teacher respondents were therefore requested to indicate by ticking against their current terms of employment. The analysed findings were presented in Figure 8

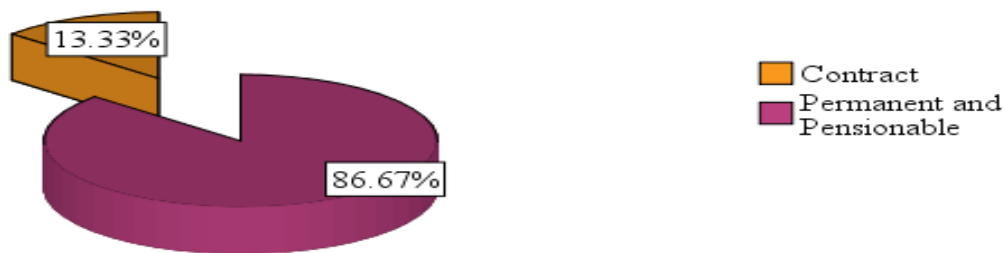


Figure 8: Terms of Employment of the Teachers of Agriculture

The teachers on contract are employed and remunerated by their respective Boards’ of Management (BoM) while those on permanent and pensionable terms are under the TSC. Tenure of service of teachers under the BoM ends immediately they are employed by the TSC. Due to job insecurity under BoM terms, they mostly tend to seek for better paying job opportunities (Waiganjo, 2021). For this reason, such teachers are less likely to pay much emphasis on initiating and maintaining long-term projects on the school farm in comparison to their counterparts under permanent and pensionable terms. By having majority of teachers on permanent and pensionable terms, then it is expected that school farms in Malava Sub-County are characterised by long term projects, a feature that is deemed beneficial for practical implementation of agriculture. The low percentage of teachers of agriculture under contractual terms in this study resonates with the findings from Nyamwembe (2018) which established that by virtue of being a vocational subject, teachers of are on high demand in the labour market and therefore fresh agricultural education graduates from colleges and universities are readily absorbed by the TSC as well as other agriculture related sectors. These study findings however contradict those from Evelia (2014) which revealed a slightly higher percentage of agriculture teachers on contractual terms than those under TSC.

One of the requirements of the Teachers’ Service Commission (TSC) is that a teacher trains in two teaching subjects and implement both upon employment subjects. It is in line with this guideline that the teacher respondents were requested to tick against their other teaching subject besides agriculture. Figure 9 presents summary of the findings.

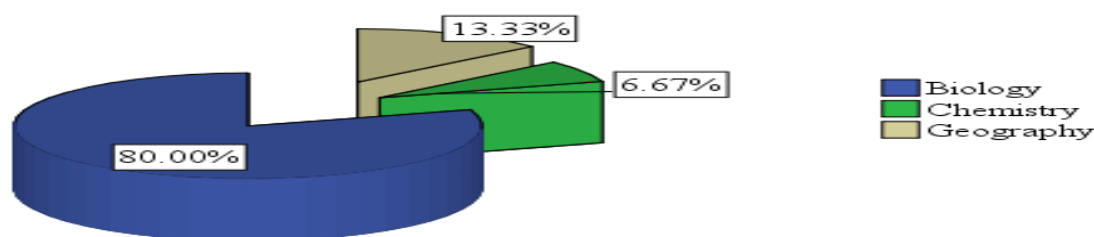


Figure 9: Subject Combinations of the Teachers of Agriculture

Several topics in Biology and Geography cover contents which are also in the secondary agriculture syllabus. Topics in Geography which cover agricultural content include; Soils, Weather and Climate, Vegetation and Agriculture. In Biology, topics such as Genetics and Reproduction in Plants and Animals have much agricultural concepts (Kiarie, 2016). The linkage or related knowledge and skills across subjects places a teacher in a better position to holistically implement the agriculture curriculum as well as explain to the learners the inter-relationship among the various subjects offered at the secondary school level (Rutoh, 2022). Huhtala and Vesanainen (2017) highlighted that the nature of training teachers undergo greatly determines their level of competency, ultimately shaping the way in which they balance and implement practical and theoretical aspects of a curriculum.

4.4 Availability of School Farm in Secondary Schools

To address the first study objective, the researcher sought to establish the relationship between the availability status of the school farm facilities and the level of acquisition of agricultural skills among secondary school agriculture students in Malava Sub-County. Availability status was measured by assessing the physical presence of a school farm as well as the various sections of the school farm such as the project plots, commercial plot, demonstration plots, museum plots and farm structures.

4.4.1 Availability of the School Farm

Both sets of respondents were requested to indicate by ticking against whether their schools had farms or not. Table 9 presents a summary of the findings

Table 9

Availability of the School Farm

School farm available	Response in frequencies and percentages					
	Teachers' response			Students' response		
	Yes	No	Total	Yes	No	Total
Freq	15	0	15	165	0	165
%	100	0	100	100	0	100

The results from both the students and teachers showed that all the sampled schools had a school farm and therefore this means that practical implementation of agriculture is feasible in all these schools. Land abundance coupled with a moderately sparse population resulting to a relatively low population density of less than 350 individuals per kilometre square as

established in the (Kenya Demographic and Health Survey, 2022) report could possibly be one of the reasons contributing to this. The rural setting of the Sub-County could be another possible reason. These findings however contradict those from Evelia (2014) which revealed that some secondary schools in Masaba North Sub-County completely lacked a school farm due to a combination of administrative, environmental or economic factors.

4.4.2 Facilities on the School Farm for Teaching Practical Agriculture

Both sets of respondents were requested to identify by ticking against various facilities found on their school farms. Table 10 gives a summary of the analysed findings.

Table 10

Facilities on the School Farm

Facility		Response in frequencies and percentages					
		Teachers' response			Students' response		
		Yes	No	Total	Yes	No	Total
Museum plots	Freq	3	12	15	23	142	165
	%	20	80	100	13.9	86.1	100
Project plots	Freq	15	0	15	165	0	165
	%	100	0	100	100	0	100
Commercial farm	Freq	9	6	15	104	61	165
	%	60	40	100	63	37	100
Demonstration plots	Freq	8	7	15	66	99	165
	%	53.33	46.67	100	40	60	100
Farm structures	Freq	9	6	15	78	87	165
	%	60	40	100	47.3	52.7	100

A functional school farm should have various facilities such as demonstration plots, project plots, museum plots, farm structures and the commercial farm (KIE, 2006). These sections are important when it comes to implementation of practical agriculture and therefore a school farm without these sections cannot be effectively utilized for hands-on teaching of the subject. Agro-ecological requirements such as rainfall, altitude, temperature and soil vary among various types and varieties of crops as it dictates various aspects of crop production such as growth rate, quality and quantity of produce, disease infection and pest infestation (Recha, 2018). Crops such as tea and coffee for instance thrive best under high altitude of range

between 1400-2000 metres above sea level, cool temperatures of 18-22 degrees Celsius and well distributed rainfall ranging between 1000-1500 millimetres per year (FAO, 2017). On the other hand, crops such as cotton, finger millet, sorghum, sisal and some drought tolerant varieties of maize such as Katumani thrive best in low altitudes of below 500 metres above sea level and low rainfall below 250 millimetres per annum (Radeny et al., 2022). The secondary school agriculture curriculum recommends agronomic practices on various ecologically diverse crops. Museum plot is a section on the school farm where exotic varieties of crops that have been discussed in the agriculture syllabus are grown.

The climatic and edaphic conditions in Malava Sub-County do not favour the growth of high altitude and low altitude crops some of which have been extensively discussed in the agriculture syllabus. Crop museums in secondary schools in Malava Sub-County should have high altitude crops such as coffee and tea as well as the low altitude crops such as millet. This section should therefore be of vital relevance in the implementation of hands-on concepts to the learners in secondary schools in Malava Sub-County in a number of ways such as; enable them to visualise impacts of climatic variation on various aspects in crop production such as pest infestation, disease infection, growth rate and general productivity, enable them physically interact and carry out agronomic practices on exotic crops that are not common in their locality and enable them appreciate the ecological diversity of Kenya with respect to crop production.

Although these crops, may face various challenges emanating from environmental stress such as high incidences of disease infection, pest infestation and stunted growth, their presence on the school farm is necessary as far as agronomical skill acquisition is concerned. Having majority of the respondents (86.1% of the students and 80% of teachers) reporting the absence of a crop museum paints a gloomy picture with respect to attainment of agronomical practices in exotic crops. These findings resonate with those from Konyango and Mutisya (2017) which established that under the 8-4-4 system, agriculture is being offered in high-rise buildings with less emphasis on the school farm and its associated facilities such as museum plots which hinders the achievement of the objective of teaching secondary school agriculture for skill acquisition.

Concerning the availability of demonstration plots, responses from the teachers slightly contradicted those from the students as eight teachers (53.33%) reported that the facility exists on their school farms while majority of the students (60%) reported of the non-existence of this section. Affirmation from the observation guide revealed that eight schools had demonstration plots as indicated by the teachers. The difference in opinion between the two sets of

respondents can be attributed to the fact that the section is hardly put into use and therefore students in some of the schools were oblivious of its existence. During the Chavakali pilot project, agriculture was meant to be vocational and therefore, the school farm had well maintained demonstration plots where students were guided on how to carry out various agronomic practices with the aim of replicating these skills back at their home farms (Saeturn, 2017). The absence of demonstration plots on some of the school farms depicts the theoretical trajectory path the 8-4-4 system of education took with respect to implementation of vocational subjects such as agriculture.

Regarding the availability of farm structures, 52.7 % of the students indicated that the facility does not exist on their school farms while 47.3% agreed that the facility exists on their school farms. This contradicts the results from the teachers as majority of the teachers (60%) indicated the existence of the facility with 40% indicating the non-existence of the facility. Based on the observation guide, farm structures existed in majority of the schools (60%) but had been left in a state of disuse and therefore the learners never knew of their existence. This reflects findings from Kyule (2017) in Baringo, Makueni and Narok Counties which established that due to too much focus on theoretical agriculture, vital facilities meant for implementation of practical agriculture such as the workshop had been turned into a storeroom to accommodate obsolete furniture and therefore the learners never knew of its existence and purpose in relation to teaching and learning of agriculture.

Project plots were available in all the schools. This could be explained by the fact that the Kenya National Examinations Council (KNEC) requires each school offering agriculture to allocate project plots to students at form four for carrying out projects specified by the KNEC as part of their KCSE examination. Majority of students (63%) reported that their school farms had the commercial farm. Affirmations from the teachers were in line with that from the students as nine teachers (60%) agreed to the existence of the commercial section. This is quite surprising since some sections that are deemed vital for the implementation of practical agriculture such as museum plots lack in most of these school farms. These findings conform to those from Waiganjo (2021) in Nakuru County which established that school principals perceive the school farm as an income generating unit and therefore tend to commercialize a larger portion of the school farm. To safeguard the commercial farm, students' access to the school farm may be partially or completely restricted to minimize incidences like theft and vandalism of the commercialized crops and livestock which violates the objective of teaching agriculture for skill acquisition.

In order to specify the exact crops being cultivated in the museum plots, the 23 students whose schools had museum plots were asked to indicate the various crops found on the section. Coffee, tea, rice, pyrethrum, millet, French beans and cotton are the crops that have been discussed in the secondary school agriculture syllabus but cannot thrive well in the agro-ecological conditions in Malava Sub-County. The learners were therefore requested to select the crops found in their school farms' crop museum section. Summary of analysed findings has been presented in Figure 10

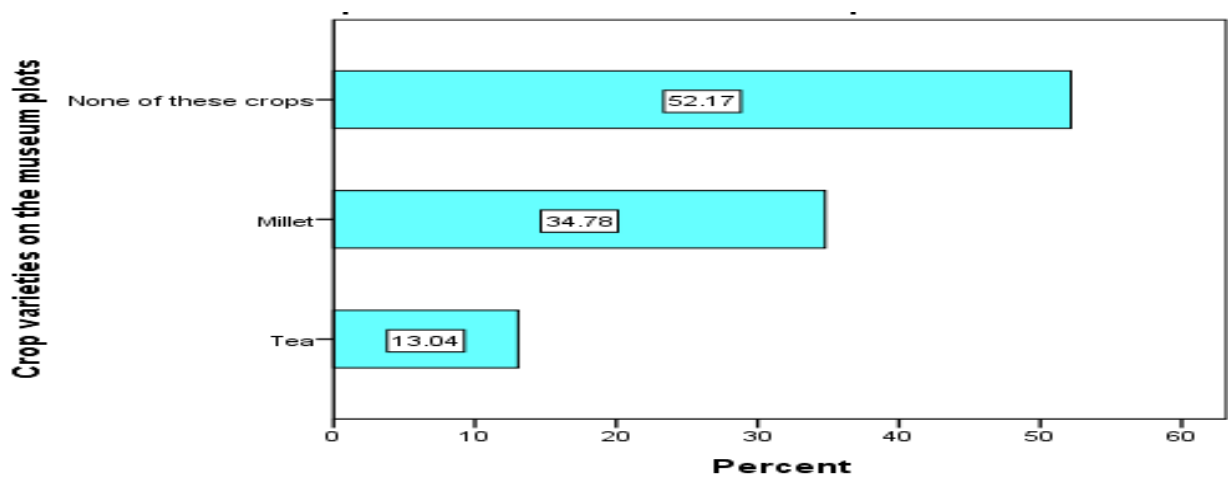


Figure 10: Crop Varieties on the Museum Plots

From the results, it was evident that millet was the most widely cultivated crop on the crop museum section while tea was the least cultivated crop. The cultivation of millet has been discussed in the form three agriculture syllabus under the topic of field crops. Millet is considered as a drought tolerant crop thus suitable for the ASAL regions. Considering the fact that over eighty percent of Kenya is considered to be arid and semi-arid, a study by Kyule and Konyango (2019) recommended that equipping students with practical agronomic skills on drought tolerant crops such as millet can significantly contribute to the exploitation of these areas which can help to boost food security. However, majority of the respondents (52.17%) reported that none of these crops existed on their museum plots. This denotes that though some schools had reserved land for the purpose of establishing museum plots, agriculture teachers in these schools made no deliberate attempts to establish the exotic crops discussed in the syllabus such as coffee and tea. This has an implication that students in these schools have no exposure to the practical agronomic practices carried out on these crops.

According to FAO (2017), coffee and tea are very crucial for the economic growth of Kenya in terms of foreign exchange and job creation. Cotton is also being touted as a potential high value crop in the near- future as the Kenyan government is envisaging on how to re-

stabilize the textile industries such as Kikomi and Rivatex (GoK, 2015). It is therefore worthy equipping students with the agronomic skills on such crops in preparation for the job market as well as pursuing courses such as agronomy at the university or college level. These findings however are contrary and could possibly be one of the reasons behind the youth, including those who studied agriculture at secondary school being devoid of practical farming skills.

4.4.3 Structures and Buildings on the School Farm

To specify types of structures and buildings found on the school farm, the respondents (Nine teachers and 78 students) who had indicated that their school farms had buildings and structures requested to indicate by ticking against the structures and buildings existing on their school farms. Table 11 presents a summary of the results.

Table 11

Structures and Buildings Found on the School Farm

Structures and buildings		Response in frequencies and percentages					
		Teachers' response			Students' response		
		Yes	No	Total	Yes	No	Total
Dwelling houses	Freq	3	6	9	23	55	78
for farm workers	%	33.3	66.7	100	29.5	70.5	100
Storage	Freq	8	1	9	78	0	78
structures	%	88.9	11.1	100	100	0	100
Sheds for	Freq	1	8	9	12	66	78
equipment and	%	11.1	88.9	100	15.4	84.6	100
machinery							
Workshops	Freq	5	4	9	33	45	78
	%	55.6	44.4	100	42.3	57.7	100
Livestock	Freq	9	0	9	78	0	78
structures	%	100	0	100	100	0	100

From the results, it was evident that Sheds for equipment and machinery were absent on most school farms as reported by 84.6% of the students and 88.9% of the teachers. The teaching of practical agriculture for skill acquisition demands the use of an array of farm machinery and equipment (KIE, 2006). The practical implementation of the topic on farm power and machinery demands the learners to actively interact with farm machinery and implements such as the tractor, tractor drawn implements such as the trailer, mould-board

ploughs and disc ploughs. A spacious shed should serve as a storage site for these implements as well as provide a conducive environment outside the classroom where the agriculture students interact with these implements and machinery during the agriculture lessons. The absence of sheds is an indicator of the non-existence of farm implements and machinery. This seems to contradict the objective of teaching agriculture for skill acquisition.

Reports on the availability of the workshop facility among the students seemed to contradict that of the teachers as the majority of teacher respondents (55.6%) reported of having the facility existing on their school farms while to the contrary, most learners (57.7%) indicated that the same facility never existed on their school farms. The differences among the two sets of respondents' opinions relating to the availability status of workshops among sampled schools can be attributed to the use of the facility for other purposes other than the teaching and learning of agriculture. Based on data from the observation guide, a workshop in one of the sampled schools had been converted into a store thus the learners were oblivious of its existence in the school. These findings conform to those by Kyule (2017) in Makueni, Narok and Baringo counties which established that workshops have been converted into stores for accommodating broken furniture as a result of emphasis on academic excellence. During the 1950s when school agriculture was still in its infancy stage in Kenya, the colonial government with financial support from donor agencies gave an auspicious start to the subject through building workshops in schools to facilitate hands-on teaching (Konyango & Asienyo, 2015). The workshop serves as a store for farm tools and equipment which are also fundamental for practical agriculture.

To establish types of livestock structures found on the school farms, the 78 student respondents who had indicated that their school farms had livestock structures were asked to indicate the specific ones that existed on their school farms. Figure 11 presents a summary of the findings.

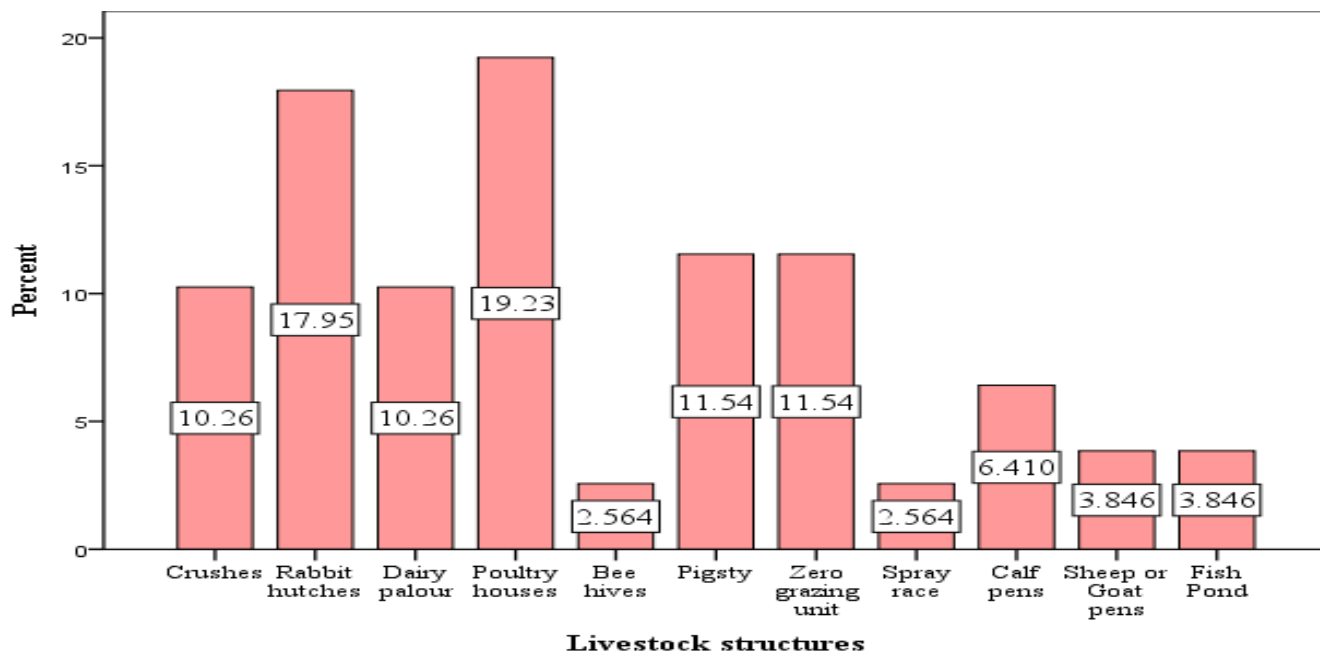


Figure 11: Livestock Structures on the School Farm

Poultry houses and rabbit hutches were reported to be the most common livestock structures. Past studies on poultry and rabbit farming indicated that both the two enterprises have one similarity in that they require relatively less space to set up in comparison to other enterprises in livestock production (Afodu et al., 2022; Mutsami, 2018). The 100% transition policy, Free Day Secondary Education (FDSE) and the general rise in human population have resulted to very high enrolment in schools and consequently, the need to set up extra classrooms as well as other physical buildings such as laboratories, lavatories and dormitories. Mlawa (2018) pointed out that this has led to the encroachment of space that had been reserved for other purposes such as playgrounds and school farms. Due to space limitation, teachers of agriculture tend to opt for setting up farm structures that require limited space. The absence of structures such as fishponds, beehives and spray races can be attributed to their large space requirement. Bee hives for instance should be sited far from the school compound to minimize on accidents and for this reason, schools with limited space cannot be in a position to have them.

Practical lessons on livestock routine management practices such as dehorning, hoof trimming, vaccination, identification, ear-notching and drug administration can only take place when the livestock under study are confined which demands the use of farm structures. Besides housing livestock, the topic on farm structures has been discussed in the form three agriculture syllabus. According to the KIE (2006), the topic has five objectives which are to enable the learner to; describe parts of a building, identify materials for construction, describe various

farm structures and their uses, describe siting of various structures and construct and maintain farm structures. For these stated objectives to be achieved, students must have maximum exposure to these structures. Despite the paradigm shift to Competence Based Education, much still has to be put in place to address the status of availability of farm structures in anticipation for the Competence Based Agriculture since according to Ndambuki et al. (2024), the first cohort of students from the Junior Secondary level which is currently being hosted in primary schools will join the Senior Secondary level.

Competence Based Agriculture currently being offered under the 2-6-3-3-3 education system is anticipated to take a more practical approach towards agriculture curriculum implementation. In the junior school category, the subject is considered as being core and according to Ngunyu (2023), by the end of grade 8, the agricultural skills acquired should enable the learner to cultivate crops and rear animals as profitable agriculture enterprises through sustainable and ethical practices for self-reliance and economic development. The topic on livestock production has been extensively covered in grades 7 and 8 with various recommended routine management activities which calls for the availability and use of various farm structures. With some schools having adequate space to set up livestock structures while others having limited space, sustainability in the implementation of practical agriculture curriculum for the purpose of skill acquisition can only be achieved by sharing of resources among schools whereby students from schools without these structures can be taken to those schools with the structures during agriculture lessons.

Besides livestock structures, storage structures are also a crucial component of an operational school farm. Acquisition of skills in Post-harvest practices entirely depends on the availability status of these structures. To address this, both sets of respondents were requested to specify by ticking against the storage structures existing available at their school farms. Figure 12 presents a summary of the findings.

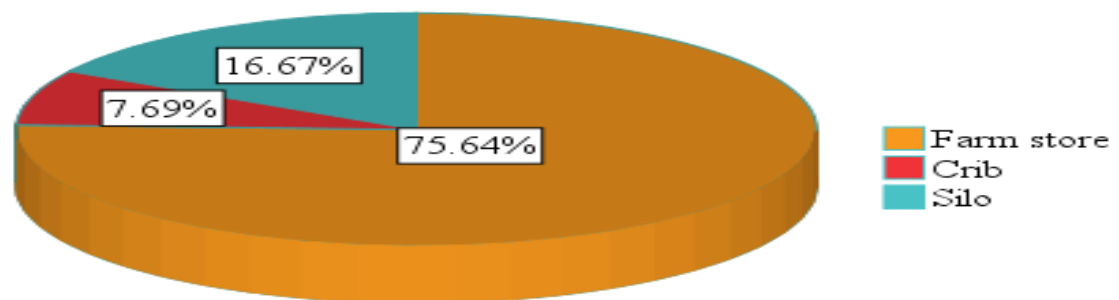


Figure 12: Post-Harvest Structures found on the School Farm

The Food and Agriculture (2019) report highlighted that food losses as a result of excessive post-harvest losses are significantly contributing to food insecurity globally. In the African continent, qualitative and quantitative post-harvest losses in grains alone were estimated to deny the farmers approximately 1.6 billion US dollars annually (Olorunfemi & Kayode, 2021). The Gok (2015) report on agricultural productivity revealed that through post-harvest losses, Kenyan farmers lose approximately over half a million dollars annually. Grains such as maize as well as perishable produce such as vegetables and fruits require good and timely post-harvest practices prior to storage to retain their quality as Gathambiri et al. (2021), attribute the perishability to the high levels of moisture content at the time of harvesting. This calls for proper post-harvest handling prior to storage.

Despite maize being the staple food for majority of Kenyans, a study by Asige and Omuse (2022) revealed that poor post-harvest handling of the crop as a result of limited technical know-how among farmers on post-harvest practices leads to rotting of grains as well as high incidences of aflatoxin which not only leads to economic losses to the farmers but also poses greater health risk to the consumers. Practical skills and in-depth knowledge on modern cost-effective post-harvest technologies could help smallholder farmers tackle postharvest losses which could in turn boost on food security and steer African nations; Kenya inclusive into middle-income economies (Koskei et al., 2020).

One of the characteristics of an effective curriculum is the ability to incorporate new emerging technologies that are relevant to the current societal needs and for this reason, Namwambah (2020) advocates for dynamism in curricula to help in churning out a skilful workforce capable of spurring societal development. Storage technology has undergone transformative changes over time due to various dynamics affecting productivity such as climate change, commercialization, mechanization and technological advancement (Gathambiri et al., 2021). For this reason, Olorunfemi and Kayode (2021) argue that traditional storage structures such as granaries which have major limitations such as being prone to pest attack and theft, permit rotting of grains and limited in size are considered obsolete and unfit for modern farming. A study by Fufa et al. (2021) recommended modern storage structures including hermetic containers, plastic bins, volcanic bins, metal silos and zero energy cool chamber (ZECC).

The topic on Field Practices which is the fourth topic in the form two agriculture syllabus aims at exposing the learner to post-harvest practices. According to the form two course book authored by Kahuria et al. (2018), the topic theoretically introduces the learner to the various forms of post-harvest practices namely; threshing, drying, cleaning, packing,

dusting, sorting and grading without any suggested learning activities requiring the teacher to practically guide the learner through these post-harvest practices. Furthermore, very scanty information with only a few diagrammatic illustrations have been provided regarding granaries which are considered an obsolete form of storage technology. Failure of the secondary agriculture curriculum to incorporate modern storage technologies with majority of the respondents (75.64%) reporting of having the traditional farm stores adduces the fact that the agricultural skills pertaining to post-harvest practices imparted into the learners is quite obsolete thus irrelevant to the current societal needs.

The topic on Forage Crops at form Three introduces the learners to the establishment, management, conservation and utilisation of various forage crops. With land becoming scarce coupled with climate change which have resulted to shortage of natural pastures, sustainability of the livestock sector rests entirely on the adoption of modern fodder conservation techniques among farmers (Mukasa et al., 2017). Silage making is one of the methods of conserving forage crops whereby silos are used in the storage of silage. However, with only 16.67% of the student respondents having silos on their school farms, it was evident that majority have not been practically exposed to the silage making process within the school farm.

Competence Based Agriculture being offered under the CBE takes a more practical approach towards the teaching of post-harvest practices. At grade eight, the topic has been extensively covered with much emphasis on simpler post-harvest structures such as wooden crates, cartons, baskets, sisal bags, jute bags and mesh bags. It is worth noting that most of these storage structures are cost-effective, require limited space, portable, reusable and can be easily made by the students with help from the teacher. With such, learners in schools without post-harvest facilities on the school farms in a better position to acquire hands-on skills in post-harvest practices.

4.4.4 Relationship between Availability Status of the School Farm and Agricultural Skill Acquisition

To determine the relationship between the independent variable (availability of the school farm facilities) and the dependent variable (level of acquisition of agricultural skills), Chi-square for relationship was employed. Summary of the data analysis is presented in Table 12.

Table 12*Availability of the School Farm and Level of Skill Acquisition Chi-Square Test*

Scale	Value	Df	p-value
Pearson Chi-Square	8.750	8	.634
N	165		

Based on the result analysis presented in Table12, relationship between the availability status of school farm facilities and level of acquisition of agricultural skills was not statistically significant at .05 level of significance since the p-value was greater than .05. For this reason, the null hypothesis was accepted which had an implication that the mere availability of the school farm does not guarantee agricultural skill acquisition among the students. These findings resonate with those from Dhakal (2017) which established that skills are acquired from experiential learning which can only be achieved when the learners actively interact with resources and facilities.

4.5 Level of Access to the School Farm

Mere presence of a school farm and its associated facilities does not have any significant contribution towards improving students' level of agricultural competencies if these very learners do not get a chance to access it. A study by Evelia (2014) established that access to the school farm among students may be limited by various factors such as school policies, distance of the farm from the school and time restriction. This study therefore aimed at establishing the level of access to the school farm facilities among students of agriculture in Malava Sub-County. Access level to the school farm and its associated facilities was measured by assessing location, distance from the school and frequency of visits to the farm by the students. This section presented opinion from both sets of respondents on access to the school farm based on its location, distance between the tuition block and the farm and frequency of visit made to the farm.

4.5.1 Location of the School Farm

Frequency at which learners visit the school farm to monitor their projects during their free time or during the agriculture lesson time is likely to be determined by its location. It was therefore imperative to determine the location, approximate distance from the tuition block and accessibility level to this facility. Both sets of respondents were asked to indicate the location, approximate distance from tuition block accessibility level to the facility. Responses from both sets of respondents were analysed. Table 13 presents the data analysis.

Table 13*School Farm Location*

School farm location		Responses in frequencies and percentages	
		Teachers' response	Students' response
Within the school compound	Freq	8	92
	%	53.3	55.8
Adjacent to the school	Freq	7	73
	%	46.7	44.2
Away from the school	Freq	0	0
	%	0	0

Both sets of respondents were requested to give the approximate distance of the school farm. Table 14 presents the analysed responses.

Table 14*Approximate Distance to the School Farm from the Tuition Block*

School farm location		Responses in frequencies and percentages	
		Teachers' response	Students' response
Less than one Kilometre	Freq	15	165
	%	100	100
One Kilometre	Freq	0	0
	%	0	0
More than one kilometre	Freq	0	0
	%	0	0

Results from Table 14 indicated that all the school farms in the sampled schools were located approximately less than one kilometre from the tuition blocks. Research findings from the researcher's observation guide affirmed that the average distance of the school farm among the sampled schools was approximately 170 metres, the furthest farm being located approximately 250 metres away from the tuition block while the closest being 120 metres.

Each agriculture lesson had been allocated 40 minutes on the timetable. Form one and two students having three lessons per week which translated to 120 minutes while form three and four students had been assigned four lessons per week translating to 160 minutes. It is worth noting that double lessons were scrapped of following the 2002 educational reforms

(KIE (2006). Despite the fact that the school farms are located in close proximity to the schools which may minimize on time wastage, the forty minutes are most likely inadequate to enable the learners access the school farm and engage in any form of constructive activities. Owing to the close proximity of the school farms, 100% of both sets of respondents indicated that they accessed the school farm by means of walking. This has no financial implication and therefore the learners can access the school farm with much ease at any time that seems convenient to them for the purpose of engaging in practical activities for skill acquisition.

4.5.2 Frequency of Visits to the School Farm

The study sought to establish how frequently students visited the school farm. Figure 13 summarily gives the findings from the student respondents.

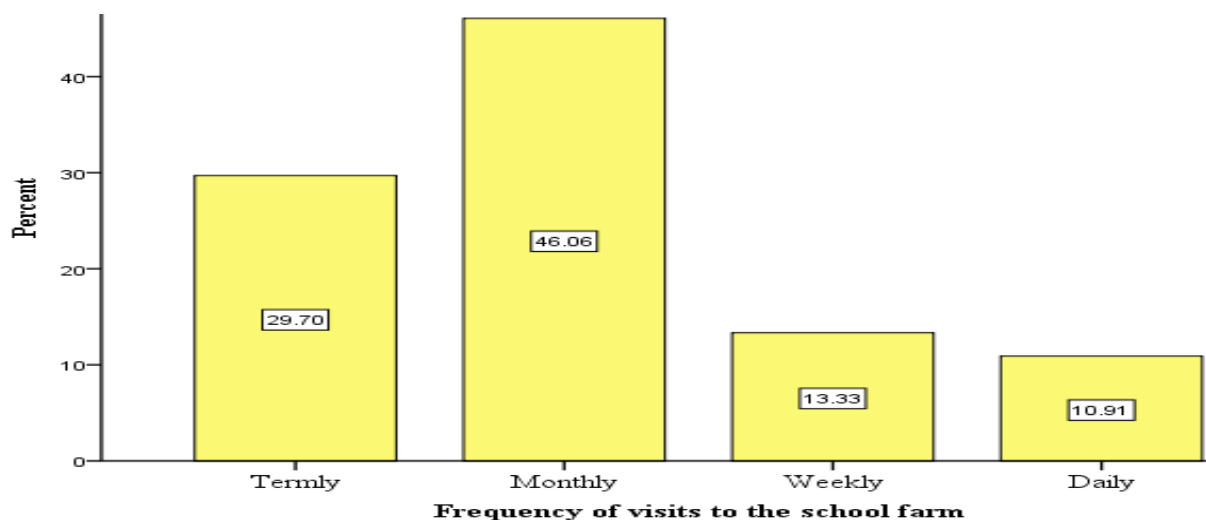


Figure 13: Frequency of Visits to the School Farm

As depicted in Figure 13, the highest proportion of students (46.06%) visit the school farm on a monthly basis while only 10.91 % do it on a daily basis. Having majority of students accessing the school farm on monthly basis does not prove beneficial to them as far as agricultural skill acquisition is concerned since this may not place them in a better position to carry out routine management practices in both crop and livestock production projects. A past study by Ojuok et al. (2020) revealed that regular access to facilities such as laboratories improves learning outcomes among students through impacting directly on their knowledge-base and psychomotor skills. With such seldom visit to the school farm, these learners are less likely to have good knowledge and skills on some agricultural concepts such as the identification and use of farm tools and equipment, weed identification and control and identification of livestock breeds.

Having established how frequently students visited the school farm facility, this study further sought to establish at what particular session the visits regularly were made. The students were further requested to give the frequency at which the visits to the facility were made different sessions. Summary of the findings have been presented in Table 15.

Table 15

Students' Access to the School Farm at Different Sessions

Session		Frequency of access to the school farm					
		Never	Rarely	Sometimes	Often	Very Often	Total
During tea break	Freq	165	0	0	0	0	165
	%	100	0	0	0	0	100
During lunch break	Freq	165	0	0	0	0	165
	%	100	0	0	0	0	100
During agriculture lessons	Freq	27	116	22	0	0	165
	%	16.4	70.3	13.3	0	0	100
In the evening after classes	Freq	15	50	42	58	0	165
	%	9.1	30.3	25.5	35.2	0	100
In the morning before classes	Freq	165	0	0	0	0	165
	%	100	0	0	0	0	100
During weekends	Freq	26	73	16	32	18	165
	%	15.8	44.2	9.7	19.4	10.9	100

Implementation of practical aspects of any curriculum, agriculture inclusive is time demanding partly due to the need to frequently access physical facilities such as laboratories and workshops (Sharpe & Abrahams, 2020). With time limitation being one of the hindrances to successful curriculum implementation, Gatuura and Mugo (2020) advocated for remedial lessons during extra sessions such as morning hours to ensure achievement of teaching-learning objectives among all categories of learners inclusive of those with special needs. It was expected that since the 40 minutes allocated to agriculture without any double lessons are hardly adequate to permit for timely syllabus coverage, teachers of agriculture would make use of these extra sessions for practical implementation of agriculture curriculum on the school farm. However, it was ironical that majority of the students reported never accessing the school farm during tea breaks, lunch breaks and morning sessions. This could be occasioned by the

fact that these breaks are relatively short to allow the learners engage in any meaningful activity on the school farm. For instance, tea breaks take 15 minutes while lunch breaks take at most one hour. Morning sessions on the other hand are reserved for other activities such as assemblies, cleaning of the school compound and remedial lessons. Weekends were the most preferred sessions. The underlying reason being that students in boarding schools mostly stay in school except when schools are closed during long holidays or mid-term breaks and therefore better placed to make use of weekends for accessing the school farm in comparison to their counterparts from day schools. It is worth noting that weekends which happen to be on Saturdays and Sundays are mostly set aside for co-curricular and religious activities thus may not be fully used for practical implementation of agriculture.

4.5.3 Level of Access to the School Farm and Agricultural Skill Acquisition

In order to establish the existing relationship between the independent variable (level of access to the school farm) and the dependent variable (level of acquisition of agricultural skills), chi-square test of relationship was utilised as the statistical method. To determine the relationship between level of access to the school farm and the level of acquisition of agricultural skills, chi-square test for independence was used. Summary of the data analysis is presented in Table 16.

Table 16

Level of Access to the School Farm and Level of Skill Acquisition Chi-Square Test

Scale	Value	Df	p-value
Pearson Chi-Square	12.103	12	.048
N	165		

The test yielded a p-value of .48 which was lesser than .05 indicating the existence of a relationship between the two variables under study. For this reason, the null hypothesis was rejected. These results echo those from Kannan and Lawal (2021) which ascertained that the degree of access to resources and facilities within a learning institution greatly determines students' skill and knowledge acquisition.

4.6 Level of Adequacy of the School Farm

The third objective aimed at determining adequacy level of the school farm. This was measured in terms of class size with reference to the average size if the school farm facility in square metres allocated to each student.

4.6.1 Size of the School Farm Allocated to Students

First, the study sought to determine size of the school farm allocated to learners for instructional purposes. The teachers were deemed as being better placed to approximate the size of the school farm compared to their students thus the information was sought from them. The analysed findings are summarily presented in Figure 14.

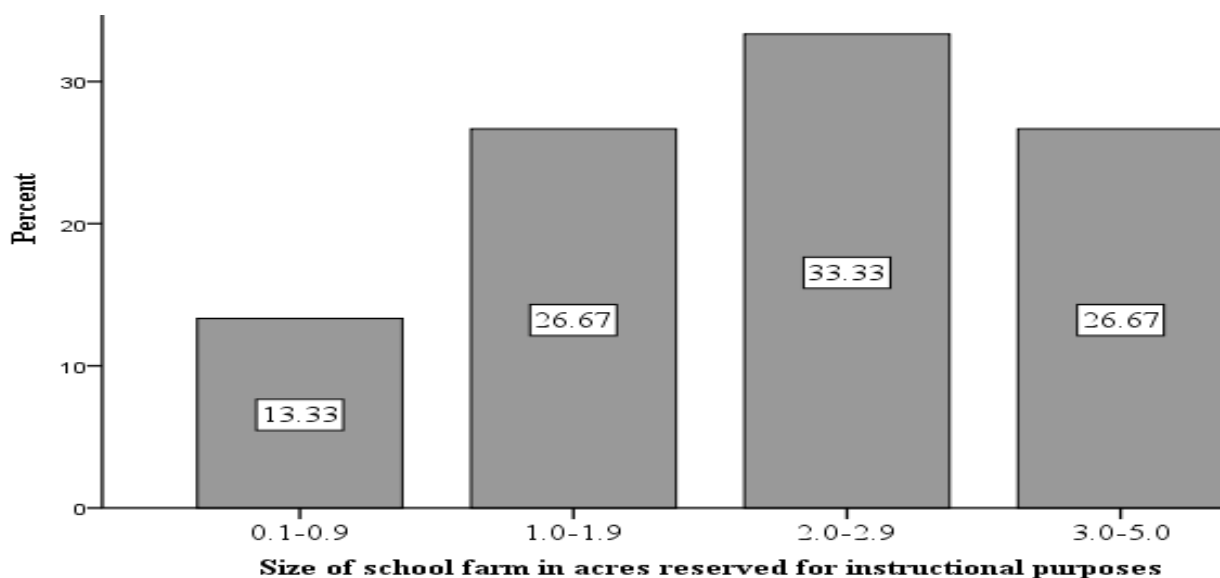


Figure 14: Size of the School Farm Allocated to Students

Summarily, 86.67% reported having more than one acre of the school farm reserved for instructional purposes. One acre of land is approximately 0.40 hectares which is also equivalent to 4000 square metres. Considering the fact that the KNEC recommends project plots measuring 12 square metres, one acre of land can therefore accommodate 333 project plots. These finding imply that with proper farm planning, all secondary schools in Malava Sub-County are capable of setting up various school farm facilities and structures. Teacher innovativeness is considered an important aspect during curriculum implementation process as Shikanga et al. (2022) posit that it determines the ability of the teacher to plan, organize, and improvise the existing resources for achievement of the set objectives. For this case, teacher innovativeness through such ways as coming up with projects and farm structures that require less physical space as well as organizing the agriculture students into functional groups can ensure sustainable implementation of the agriculture curriculum in the 13.33% schools that had less than one acre. Administrative support through means such as leasing of land from the neighbouring community members can also address the shortage.

The results from the teachers however included the commercial section. This section is always considered as an income generating unit for the school and for this reason, it is not commonly used for instructional purposes in most schools as students' access may be limited (Waiganjo, 2021). Based on the observation guide, this section had been allocated the largest portion, exceeding three acres in some schools. Though schools seem to have adequate land, more emphasis is laid on commercialization at the expense of practical agriculture curriculum implementation for skill acquisition. Findings from this study however seem to contradict those from Evelia (2014) which revealed that majority of school farms in Masaba North range between 0.25-0.5 acres and attributed the shortage to the rapid increase in human population.

4.6.2 Class Size

Both sets of respondents were asked to give form three student enrolment in agriculture. Figure 15 presents summary analysis of the findings.

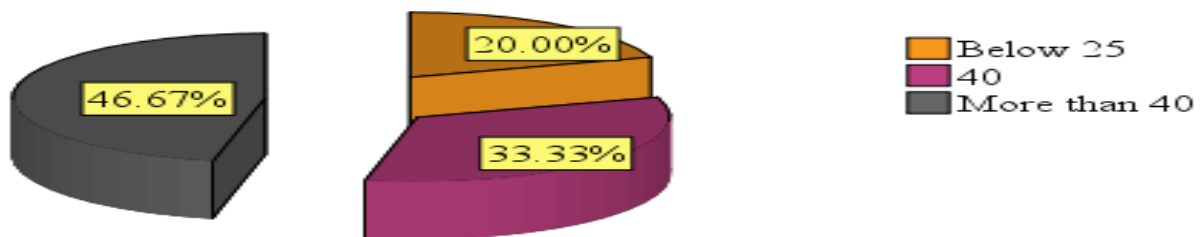


Figure 15: Class Size

According to the Ministry of Education, Science and Technology (2014) specifications, a class size of more than 40 students is technically considered to be large, that comprising of 26-40 students is considered to be average while that of less than 25 students is considered to be a small. From the class observations by the researcher established that class size was relatively small among the County and Extra-County school categories when compared to the Sub-County ones. Class size in agriculture is expected to significantly decline in form three after subject selection. However, this was not the case schools found in the Sub-County cadre. One of the schools in this category had a class size of ninety-three students of agriculture. These findings validate those from Waiganjo (2021) in Nakuru County which attributed high enrolment in agriculture in similar category of schools to the limited array of technical subjects offered to learners during subject selection. Past studies have revealed that class size has a great implication on the adequacy, access and distribution of learning resources and facilities among learners (Moluayonge & Park, 2017; Waiganjo et al. 2019).

4.6.3 Plot Allocation to Students

To determine the level of attention given to agricultural projects, students who as the curriculum beneficiaries are expected to play an active role during the teaching and learning process were requested to indicate how often their teacher had allocated them plots for project activities either individually or in groups. From these findings, 100 % of the students reported that they had never been allocated individual plots. However, the results for plot allocation in groups were presented in Table 17.

Table 17

Allocation of Group Plots

Frequency of allocation	Frequency	Percent
Never	124	75.2
Rarely	30	18.2
Sometimes	11	6.7
Often	0.0	0.0
Very often	0.0	0.0
Total	165	100

Approximately 75.2 % of the students reported never having been allocated plots in groups which was a clear indicator that their level exposure to project work was relatively low. Denying students, an opportunity to partake practical activities in groups hinders them from nurturing their communication, collaborative and problem-solving skills which according to Momanyi and Rop (2020) are considered vital for the 21st century learner. The CBE aims at instilling these skills among the learners and for this reason, interactive learning through project work has been prioritised in the Competency-Based Agriculture (CBA). Unlike the case of 8-4-4 system where projects were presented as suggested learning activities to be conducted after topic completion, in the CBA, project work has been integrated in the teaching-learning process with learners expected to keep a track record of their project work. Furthermore, the project work in CBA are examinable unlike in the 8-4-4 where only the KNEC projects at form four were examinable. With such changes, it is anticipated that more focus will be project-based learning which will in turn promote practical implementation of the agriculture curriculum for skill acquisition.

To ascertain efficiency of groups, the 24.9% respondents who had reported having been allocated project plots in groups were requested to approximate the size of groups. Figure 16 presents the analysed findings.

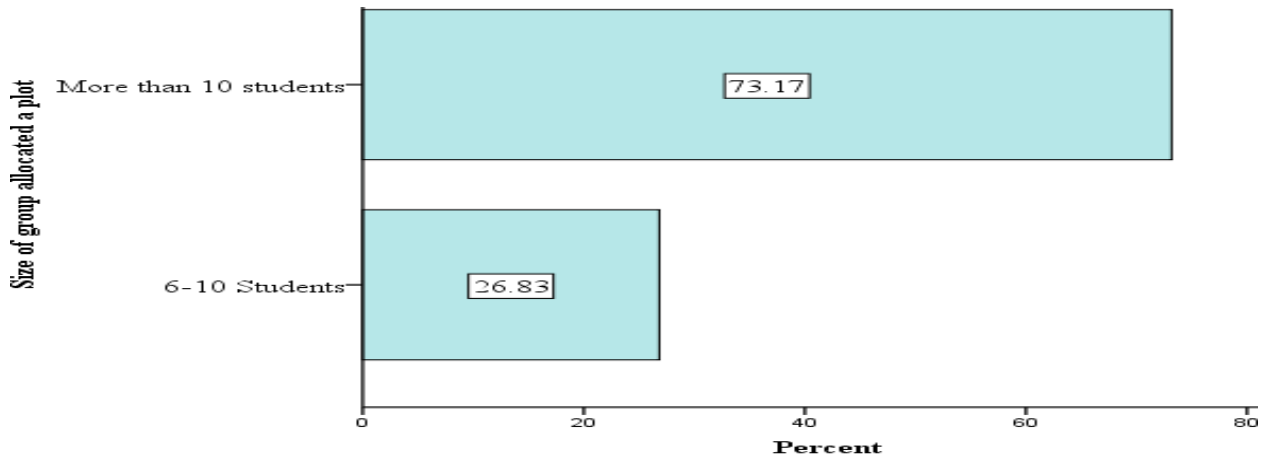


Figure 16: Group Size in Plot Allocation

Majority of the respondents (73.17%) reported of sometimes being in groups of more than ten students. However, it was quite surrealistic that no respondent reported indicated having been placed in groups of less than five. A past study by Moluayonge and Park (2017) affirmed that in large groups exceeding five, not all the students get an opportunity to be active participants in the learning activity as majority of them become passive. By engaging such large groups in project activities, then it is more likely that majority of the learners will be passive participants thus will not acquire the practical skills under study. Such students upon completing secondary school education will most likely be devoid of practical farming skills thus will not be in a position to venture into farming or pursue agriculture-related careers. The ultimate impact of this is the continued rise in youth unemployment and food insecurity. This completely violates the objective of teaching secondary school agriculture for skill acquisition with the hope of reducing unemployment, boosting food security and steering the country towards economic prosperity thus achieving Vision 2030.

4.6.4 The Young Farmers' Club

The Young Farmers Club of Kenya (YFCK) was formed with the aim of shaping the youth, especially school students into prospective future farmers. It has been crucial in instilling life-long farming skills among many students, especially those who fail to further their studies beyond the secondary school level. Findings from Waiganjo (2021) established that the projects initiated and maintained by the YFCK members on the school farm are often used by

the teachers of agriculture for instructional purposes especially in situations where the school farm is inadequate to allow for students to have individual plots. To determine if active YFCK existed, respondents were requested to indicate by ticking against the availability status of an active YFCK in their respective schools. Figure 17 presented a summary of the data analysis.

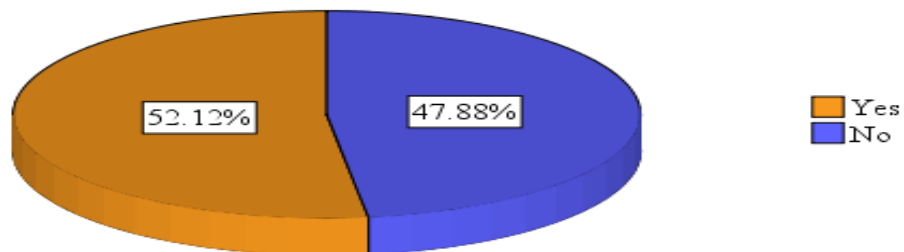


Figure 17: Presence of an Active Young Farmers Club

Eighty-six students (52.1 %) had active YFCK in their schools while seventy-nine students (47.9 %) had no active YFCK. The 86 who had indicated that their schools had active YFCK were further asked whether the YFCK had been allocated a section of the school farm for conducting projects. Analysed results were presented in Figure 18.

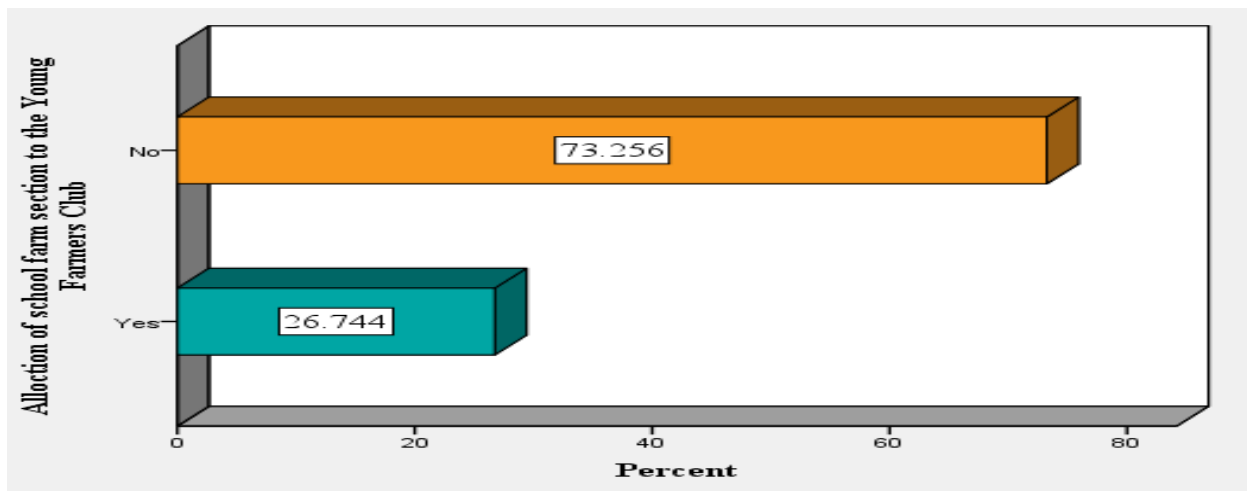


Figure 18: Farm Allocation to YFCK

Twenty-three respondents (26.7 percent) indicated that the YFCK in their schools had been allocated a section of the school farm for project activities while sixty-three respondents (73.3%) indicated that the YFCK had never been allocated a plot of land within the school farm. This clearly pointed out the inadequacy level of school farms in the study area.

4.6.5 Adequacy of School Farm Facilities

The study further probed into establishing level of adequacy of school farm facilities. These included; project plots, museum plots, commercial farm and demonstration plots. Summary of the data analysis were presented in Table 18.

Table 18

Adequacy Level of School Farm Facilities

Facility		Teachers' Responses			Students' Responses		
		Not available	Inadequate	Adequate	Not available	Inadequate	Adequate
Demonstration plots	Freq	7	7	1	99	55	11
	%	46.67	46.67	6.76	60	33.3	6.7
Commercial farm	Freq	6	1	8	61	12	92
	%	40	6.7	53.3	37	7.3	55.7
Museum plots	Freq	12	3	0	142	23	0
	%	80	20	0	86.1	13.1	0
Project plots	Freq	0	9	6	0	154	11
	%	0	60	40	0	93.3	6.7

From the results, the museum plots were not available in most of the schools as reported by majority of the respondents (80 % teachers and 86.1% students). Project plots were inadequate as reported by 60% of teachers and 93.3% of students. Demonstration plots were also missing in majority of the schools as reported by 60% of the student respondents. It was quite surprising however that the commercial section was very adequate in the sampled schools as reported by 53.3% of the teachers and 55.7% of the students. From the researchers' observation, a particular school for instance had three acres reserved for sugarcane growing and less than 0.25 acres allocated to students as project plots with demonstration plots and the crop museum missing. Though students can be exposed to the agronomic practices on this section, access and utilization may be restricted. The high rate of absence and inadequacy of these vital sections negates the aim of the form three agriculture syllabus authored by Kahuria et al. (2018) of exposing students to the basic principles of agriculture that can be put into practice for the benefit of the individual and the community in general.

One of the main distinguishing features of the CBE is that it embraces a criterion referenced approach whereby emphasis is placed on students' ability to perform tasks for acquisition of core-competencies and for this reason, Ndambuki et al. (2024) observed that CBA implementation demands incorporation of an array of facilities. The first cohort of students from this system are expected to join secondary schools in early 2025. However, with majority of schools lacking vital sections of the school farm that are vital for implementation of practical agriculture, it is unlikely that secondary schools in Malava Sub-County are prepared for implementation of CBA.

This shortage is however expected to be sorted out in the CBA with the introduction of innovative gardening techniques such as square foot gardening. According to the grade eight course book authored by Ngonyu (2023), the learners are introduced to this farming technique whereby gardens are divided into blocks measuring four feet by four feet. Each block is further divided into smaller blocks measuring 1 foot by one foot (30 cm by 30 cm) which are allocated to individual learners. Such innovative techniques will ensure sustainability in the implementation of practical agriculture with the continued rise in student enrolment since technically, one acre (4000M²) will accommodate 44,444 blocks.

4.6.6 Adequacy of the School Farm in Relation to KNEC Projects

It is a mandatory requirement by KNEC for any agriculture student to be examined in three different papers in KCSE. Papers 1 and 2 cover the theoretical aspects while paper 3 is project work. The project work always comes in two options; crop growing or livestock rearing from which the school can choose only one of the options. The cost implications in livestock rearing projects force most schools to opt for the crop production projects. For schools that opt for a crop growing project, the KNEC guidelines require each candidate to be allocated a plot of land measuring 12 square metres. It was therefore imperative to establish if there was adequate land in the sampled schools to enable the candidates carry out their KNEC projects as well as allow for the other students in the lower classes to carry out their project work as recommended by the KIE. The teacher respondents were therefore requested to indicate whether their school farms were adequate to allow the candidates conduct their KNEC projects as well as the other agriculture students in the lower forms. Figure 19 presents a summary of the results.

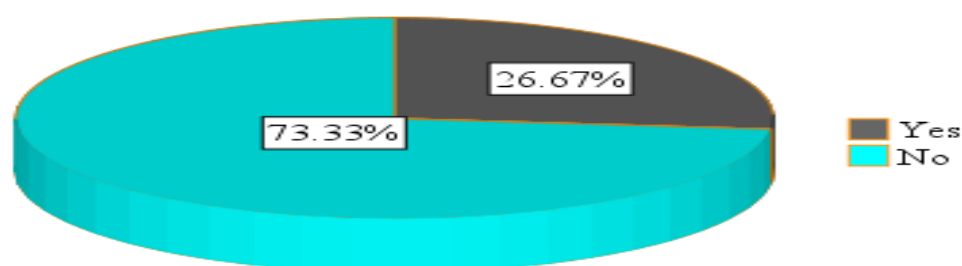


Figure 19: Adequacy of Project Plots for Both KNEC Activities and the Lower Classes

Eleven teachers (73.33%) reported having inadequate school farms that cannot accommodate KNEC projects and still remain for the lower forms to use for project work. The KNEC projects commence in January and end in September, an indicator that most students in the study locale are never exposed to hands-on activities on the school farm for eight months. It should be noted that the eight months cover the entire term one, two and half of term three. The school farm is therefore left vacant in September, a period during which the students in the lower forms are always preparing for the end of year exams. This implies that they hardly have any time for putting the theoretical aspects learnt in the classroom into practical use on the school farm. This violates the vision of school agriculture which envisages to impart practical farming skills into learners to help steer Kenya to a middle economy status by 2030.

The eleven teachers (73.3%) were further requested to indicate by ticking against the level of exposure among the different forms to the school farm. Table 19 presents a summary of the results.

Table 19

Level of Exposure to the School Farm of Different Forms

Form	Level of exposure					
	Highly exposed	Moderately exposed	Lowly exposed	Least exposed	Total	
One	Freq	0	1	1	9	11
	%	0	9.1	9.1	81.8	100
Two	Freq	0	2	5	4	11
	%	0	18.2	48.5	36.4	100
Three	Freq	0	2	1	8	11
	%	0	18.2	9.1	72.7	100
Four	Freq	2	9	0	0	11
	%	18.2	81.8	0	0	100

Form ones and threes were the least exposed students to the school farm while form fours were the most exposed. High exposure of the form fours is likely linked to the mandatory KNEC projects that the students need to monitor from time to time. The least exposure among the form threes is linked to the extensive syllabus at this particular class as it comprises of ten topics. By virtue of being pre-candidates, the teachers focus more on early syllabus completion at the expense of experiential learning hence the low exposure to the school farm. At form one, the class size always happens to be very large since subject selection has not yet been done which according to Waiganjo (2021) makes it difficult for them to access the school farm for instructional purposes. This is however expected to reduce at form two after subject selection among the technical options has been done. The least exposure to the school farm among the form one and three students denies them the opportunity to acquire agricultural skills which are necessary in the world of work.

4.6.7 Relationship between Level of Adequacy of the School Farm and Students' Level of Agricultural Skills

In order to establish the relationship between the independent variable (level of adequacy of the school farm) and the dependent variable (level of acquisition of agricultural skills), chi-square test of relationship was used. Table 20 gives a summary of the findings.

Table 20

Level of Adequacy of the School Farm and Level of Skill Acquisition Chi-Square Test

Scale	Value	Df	p-value
Pearson Chi-Square	17.232	12	.025
N	165		

The analysis test yielded a p-value of .025 which is less than .05, an indicator of the existence of a significant relationship between the two variables under study. For this reason, the null hypothesis was rejected in favour of the alternative hypothesis. Having established the existence of a significant relationship among the two variables, Cramer's V test was employed in determining magnitude of the relationship, yielding a value of .34 which denoted a strong relationship. Similar findings from Waiganjo (2019) established that smaller class sizes not only allow for better classroom management but also make it possible for the teacher to employ learner-centred approaches which enhance skill acquisition in agricultural education. Kyule (2016) points out that skills can only be acquired by active participation and therefore, with

low student-facility ratio, each learner gets an opportunity to be actively engaged in the practical activities within the school farm which enhances skill acquisition.

4.7 Utilization of the School Farm

The fourth objective aimed at determining relationship between level of utilization of the school farm and level of acquisition of agricultural skills among form three students of agriculture in Malava Sub-County. Level of utilization was assessed through measuring frequencies of practical sessions on the school farm

4.7.1. Utilization of the School Farm for Instructional Purposes

In order to establish whether school farms are utilized for instructional purposes, respondents were requested to indicate by ticking yes in case they utilize the farm during curriculum implementation or indicate no in case do not. The results were analysed and presented in Figure 20.

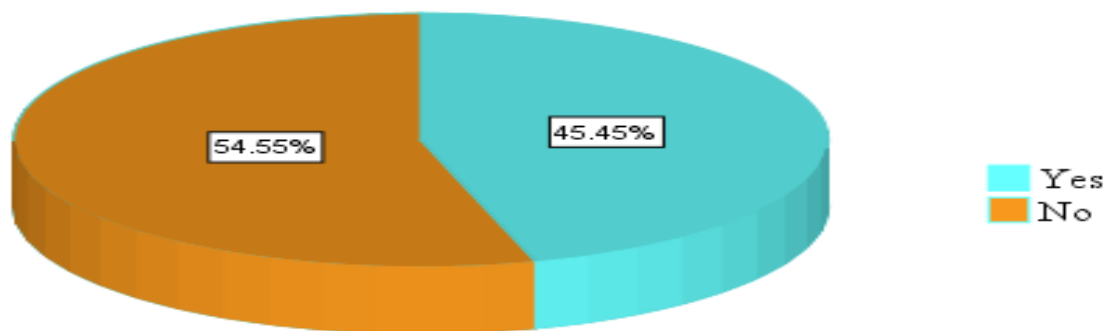


Figure 20: Utilization of the School Farm in Agriculture Curriculum Implementation

As indicated in Figure 20, majority of the students (54.55%) reported not using the facility for instructional purposes. This clearly portrays the much focus on theoretical teaching for the sake of passing final examinations something that Kyule (2017) attributes to the high levels of mastery learning at the peril of practical agriculture.

4.7.2 Frequency of Utilization of the School Farm for Agricultural Activities

The 45.45% students who reported the of the farm were further requested to indicate how frequently they utilized it for carrying out various agricultural activities such as demonstrations, student projects, growing crops for sale, crop museum and livestock production. Table 21 presents a summary of the data analysis.

Table 21*Frequency of Utilization of the School Farm for Various Agricultural Activities*

Agricultural activity	Frequency of utilization							Total
	Never	Annually	Termly	Monthly	Weekly	Daily		
Demonstrations	Freq	26	9	3	25	0	0	75
	%	34.7	12.0	4.0	33.3	0	0	100
Projects	Freq	0	64	11	0	0	0	75
	%	0	85.3	14.7	0	0	0	100
Growing crops for sale	Freq	58	9	8	0	0	0	75
	%	77.3	12.0	10.7	0	0	0	100
Crop museum	Freq	50	14	11	0	0	0	75
	%	66.6	18.7	14.7	0	0	0	100
Livestock production	Freq	0	0	30	45		0	75
	%	0	0	40.0	60.0		0	100
Any other use (Specify)	Freq	28	0	0	0	0	0	75
	%	100	0	0	0	0	0	100

From the results, it was clear that most of the the form Three Students of agriculture in Malava Sub-County hardly make use of the school farm for conducting various agricultural activities as recommended in the syllabus. Kahuria et al. (2018) stipulate that the form three agriculture syllabus aims at exposing students to the basic principles of agriculture that can be put into practice for the benefit of the individual and the community in general. With majority of students (85.3%) reporting that they get involved in projects only once in a year, achieving this aim may prove futile. The project method is a teacher-facilitated collaborative approach in which students acquire and apply knowledge and skills to define and solve realistic problems using a process of extended inquiry (Njura et al., 2020). Roberts and Harlin (2017) consider it as an important element of Agricultural Education and Training (AET) as it equips students not only with practical skills but also other competencies such as communication, collaboration and creativity. The low exposure of agriculture students to project work denies them of hands-on skills as well as these crucial 21st century competencies. It was also ironical that majority of the students (77.3%) are never given an opportunity to use the commercial farm for instructional purposes despite most this section being the most abundant in most schools.

School agriculture should enable students perceive agriculture as a dignified and profitable venture (KIE, 2002). Yaye et al. (2017) affirm that agribusiness is rapidly becoming a very profitable venture that the youth especially in Africa should embrace. Denying students an opportunity to make use of the commercial farm for instructional purposes, especially those from backgrounds where agriculture is not practiced as an economic activity denies them the opportunity to perceive the profitability in farming. Majority of the students (66.6%) reported that they never make use of the crop museum. This facility should expose a student to the agronomy of certain exotic crops such as coffee that are not commonly grown in Malava Sub-County for skill acquisition.

As far as students' utilization of the school farm for livestock production is concerned, 40% reported that they utilize the school farm for this purpose on a termly basis while another 60% on a monthly basis. Exposing students to livestock production frequently engrains into them skills in animal husbandry that are necessary in carrying out various management practices involved in rearing various species of livestock. Most of the counties in Kenya are ASAL, making livestock production the most viable economic activity (Mukasa et al., 2017). Projects in livestock production however tend to be expensive to initiate and maintain and always require more attention in terms of carrying out various routine management practices. In fact, some practices like feeding have to be carried out on a daily basis and for this purpose, most students hardly get involved in livestock projects. This conforms to study findings from Mugambi et al. (2022) which established that most livestock production projects initiated by students hardly succeed in comparison to those on crop production. Njura et al. (2020) suggest to achieve food security and reduce on youth unemployment, teachers should emphasize on guiding learners to carry out projects on both livestock and crop production when teaching to help learners acquire agricultural skills in both sectors.

In order to establish at when the students utilized the school farm specifically for instructional purposes, the 45.45% students who had earlier indicated that they use the school farm during the teaching and learning of agriculture were asked to indicate how frequently they utilized the school farm for instructional purposes during various sessions. Table 22 presented a summary of the findings.

Table 22*Frequency of Utilization of the School Farm at Different Sessions*

Frequency of utilization of the school N	Minimum	Maximum	Mean	Std. Deviation
farm for practical activities during				
Tea break	75 1.0	1.0	1.000	.0000
Lunch break	75 1.0	1.0	1.000	.0000
Agriculture lessons	75 1.0	2.0	1.480	.5030
Evening after classes	75 1.0	5.0	2.573	1.0420
Morning before classes	75 1.0	1.0	1.000	.0000
Weekends	75 1.0	5.0	2.453	1.1064

The researcher developed a scale where any item that scored a mean range of 1.0- 1.5 was rated as very low, 1.6-2.4 rated as low, 2.5-3.3 as moderate, 3.4-4.2 as high and 4.3-5.0 as very high. Utilization of school farm during tea break, lunch break morning sessions and agriculture lessons was generally low. The low utilization during lesson time can be linked to the wide syllabus and inadequacy of time located to the subject as it was indicated earlier in table 15. The school farm should be made use of during agriculture lessons just the same way the laboratory is utilized during Biology, Chemistry and Physics lessons (Jjuuko et al., 2019). With such low levels of school farm utilization, the secondary school agriculture curriculum objective of exposing students to the basic principles of agriculture which can be put into practice for the benefit of the individual and the community in general cannot be achieved.

4.7.3 Frequency of Utilization of the School Farm at Different Classes

To determine how frequently the learners utilized the school farm for instructional purposes during their three years in school, the students were requested to indicate in which class they had frequently made use of the school farm beginning from form one. The results from the students were presented in Figure 21.

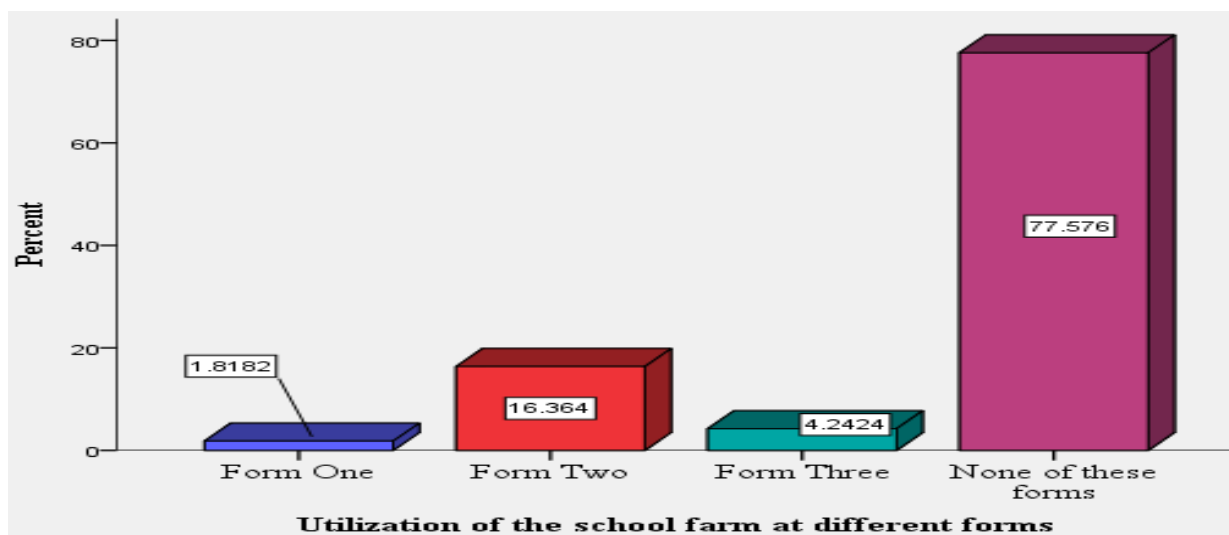


Figure 21: Frequency of Utilization of the School Farm for Instructional Purposes at Different Classes

Based on the findings, majority of the students (77.58%) reported having not made use of the school farm during their study period in secondary school. These findings can be linked to the earlier findings in table 15 which established that the students in the lower forms are least exposed to project work on the school farm due to such factors as; time limitation, commercialisation of the school farm and allocation plots for KNEC projects. From the results, it is worth noting that form One and Three were the classes in which the learners were least exposed to the facility for instructional purposes. This denies the students in these classes an opportunity to acquire useful skills that are required in the job market. Utilization of the school farm in form two was relatively higher than in any of the other classes, this can be linked to findings from Mugambi et al. (2022) that projects in crop production are much preferred since they have a higher success rate than those in livestock production. It is worth noting that the form two syllabus comprises of eight topics; three on livestock production and five on crop production.

The form Three agriculture syllabus comprises of ten topics which include; selection and breeding, livestock rearing practices, farm structures, land tenure and land reform, soil and water conservation, weeds and weed control, crop pests and diseases, field practices, forage crops and livestock health. Most of these topics cover content on livestock production. At the end of each topic except for land tenure and reform, the syllabus recommends a number of practical activities to be conducted on the school farm. This therefore means that apart from covering the theoretical aspects, form three agriculture students should spend some considerable time on the school farm or in neighbouring farms for skill acquisition to be

achieved. These study findings however seem to indicate that majority of agriculture students in Malava Sub-County have not been using the school farm since form one.

4.7.4 Relationship between Level of Utilization of the School Farm and Level of Acquisition of Agricultural Skills

In order to establish relationship existing between the independent variable (level of utilization of the school farm) and the dependent variable (level of acquisition of agricultural skills), chi-square test of relationship was used. Analysed results were presented in Table 23.

Table 23

Level of Utilization of School Farm and Level of Agricultural Skill Acquisition Chi-Square Test

Scale	Value	Df	p-value
Pearson Chi-Square	27.334	8	.032
N	75		

The analysis test yielded a p-value of .032, which was less than .05 and for this reason, the null hypothesis was rejected in favour of the alternative hypothesis, indicating the existence of a significant relationship between level of utilisation of the school farm facility and level of acquisition of agricultural skills. Cramer’s V test was employed in determining the magnitude of the relationship. A value of .21 was attained denoting a strong relationship. Similar findings were arrived at by Dumbiri (2019) which affirmed that skill acquisition in vocational education which encompasses agricultural education depends upon the extent to which the teachers as the facilitators avail and put into use the available resources and facilities.

4.8 Acquisition of Agricultural Skills

The sub-section addressed the dependent variable which was assessed through assessing the status of projects and demonstrations on the school farm in crop and livestock production.

4.8.1 Skill level from Exposure to Various Practical Activities

The researcher first sought to determine students’ level of skills acquired from exposure to various practical activities. Table 24 presents a summary of the analysed findings.

Table 24*Skill Level from Exposure to Various Practical Activities*

Level of skills acquired from	N	Minimum	Maximum	Mean	Std. Deviation
Exposure to carrying out projects on the project plots	165	2.0	3.0	2.067	.2502
Exposure to carrying out Demonstrations on the school farm	165	1.0	2.0	1.139	.3474
Exposure to observing what is done in the school farm by the farm workers	165	1.0	3.0	1.533	.6201
Exposure to visiting agricultural institutions/nearby farmers	165	1.0	3.0	2.279	.5800
Engaging in practical agriculture at home	165	1.0	3.0	2.152	.6496

A rating scale for measuring level of skills was designed by the researcher such that any score within the range of 1.0-1.5 was rated as below average, 1.6-2.4 as average and 2.5-3.0 as above average. The average mean of skills acquired from exposure to agriculture from the five different sources was 1.834 which was rated as average. Surprisingly, level of skills acquired from exposure to practical activities within the school farm through exposure to projects, demonstrations and observations on the commercial farm had a mean of 1.58 which was below average. Based on findings indicated in Table 22, students' level of utilization of demonstration plots and the commercial farm is low and so is their level of skills. Exposure to visiting agricultural institutions/nearby farmers had an average mean of 2.279. This is in line with findings from Nzomo (2021) which established that through field trips, agriculture students get an opportunity to interact with real farming experiences thus improving on their knowledge base. As Akenga (2014) established that most families in Malava- Sub-County depend on agriculture as their main source of livelihood, students especially those from the Sub-County schools which are purely day schools are more likely to engage in farming thus acquiring farming skills. This can be supported by Findings from Mugambi et al. (2022) which established that student engagement in farming at home improves on their agricultural skills.

4.8.2 Learners' Skill Level on Practical Activities Recommended in the Syllabus

Having established that the form three agriculture students have acquired some level of agricultural skills from engaging in projects and demonstrations on the school farm, it was sagacious to determine level of skills acquired by learners in specific projects and demonstrations recommended by the syllabus on the various topics covered from form one to form three. Respondents were requested to rate the level of their agricultural skills. Appendix D summarised the data analysis findings.

The various suggested learning activities were broadly categorized into two groups which included; demonstrations and projects in crop production and demonstrations and projects in livestock production. A rating scale for level of skills was designed by the researcher such that any score within a range of 1.0-1.5 was rated as being below average, 1.6-2.4 as average, 2.5-3.0 as above average. The overall average mean knowledge was below average at 1.5191. Out of the 30 practical activities, 18 were on crop production while 10 were on livestock production. Practical activities on farm tools and farm structures touch on elements on both crop and livestock production. The mean knowledge level for practical activities in livestock production was 1.6261 while that for crop production was 1.51. Irrigation, apiculture and aquaculture achieved very lowly rated mean of 1.00. Poor skill levels in apiculture and aquaculture can be linked to the in-availability of fish ponds and bee hives most schools as it was evident in Figure 13. The low skill level in irrigation is partially due to the well distributed rainfall throughout the year in the study locale thus over-reliance on rain-fed agriculture.

A survey by Mukasa et al. (2017) on policy options to support the agriculture sector growth and transformation strategy in Kenya revealed that most of Kenya's land is arid and semi-arid with only about 17% of the land having high or medium potential for intensive crop cultivation and therefore pointed that proper policies on irrigation are necessary. According to the Government of Kenya (2015) report, the Kenya National Water Master Plan 2030 has been included in Vision 2030 and aims to present a framework for water resources development and management consistent with the country's social and economic development activities. The plan envisages to increase the area under irrigation to 1.2 million hectares (from around 160,000 in 2013). However, with such low skill levels in irrigation among secondary school agriculture students who are deemed as the future agriculturists, the achievement of this plan and food security in general in Kenya is likely to remain a pipe dream.

4.8.3 Status of Projects and Demonstrations on the School Farm

Considering the fact that agricultural skills can be acquired from other sources such as engaging in farming at home as well as field trips to agricultural farms, the researcher considered it imperative to assess the status of projects and demonstrations initiated by the learners on the school farm and use it as the indicator for the dependent variable. Assessing the status of these practical activities would permit the researcher to decipher specifically level of skills learners have acquired from exposure to the school farm.

The observation guide was instrumental in assessing status of projects and demonstrations on the school farm. For practical activities on livestock production, the assessment majored on such factors like the cleanliness of the livestock structures, external parasite control, identification practices, hoof trimming and dehorning in cattle, sheep and goats. For crop related projects and demonstrations the extent to which field practices including; weeding, pest-control control, disease-control, pruning, soil and water conservation and spacing were used as the basis of assessment. A Likert scale of five points was used. Cronbach's Alpha for the four areas of under consideration was 0.71 which is slightly above the recommended 0.70 for social sciences hence it was deemed suitable for use. Summary of the findings was presented in Table 25.

Table 25

Status of Projects and Demonstrations on the School Farm

Status of	N	Min	Max	Mean	Std. Dev
Projects in Crop production	15	1.00	3.00	1.867	.7432
Projects in Livestock production	15	1.00	3.00	2.000	.8452
Demonstrations in Crop production	15	1.00	3.00	1.933	.8837
Demonstrations in Livestock production	15	1.00	4.00	2.400	1.1212

A rating scale for measuring status of projects and demonstrations on the school farms was designed by the researcher such that any item that had a mean score within 1.0-1.5 was rated as very poor, 1.6-2.4 rated as poor, 2.5-3.3 as average, 3.4-4.2 as good and finally 4.3-5.0 as very good. Overall mean status had a poor rating at 2.05. During the observations, the researcher encountered projects and demonstrations that were not properly maintained in most of the schools. Weed, disease and pest infestation were very common for the projects and demonstrations in crop production while in animal production, dirty and leaking livestock structures were common in most schools. This clearly reflected the low level of access and utilization. The practical activities in livestock production had a slightly higher mean than those

on crop production. This can be attributed to the fact that carrying out management practices on some livestock species such as rabbits demands less time in comparison to crop production. Furthermore, livestock are less affected by short-term weather conditions such as hailstones, heavy rains and strong winds which can have devastating effects on crops. The respondents were also requested to rate the general status of the projects and demonstrations on the school farm. Figure 22 presents the findings.

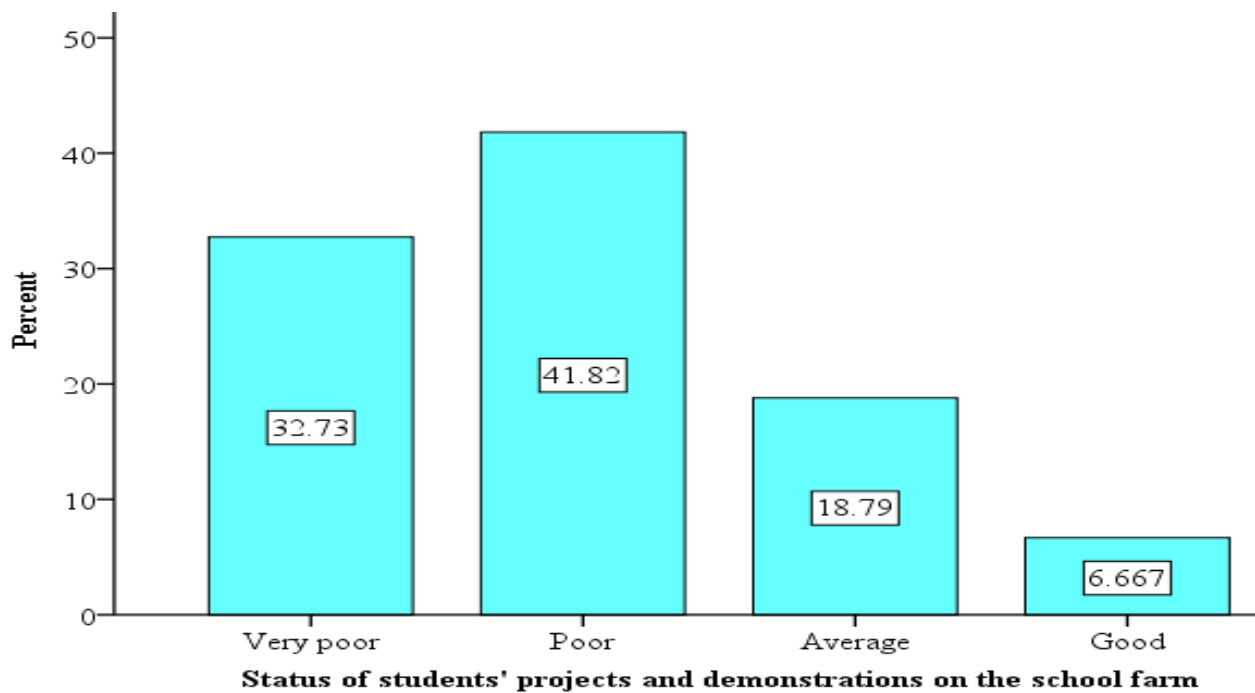


Figure 22: Status of School Farm Projects and Demonstrations

From the findings, most respondents (41.82%) reported that the demonstrations and practical activities are in a poor state, another 32.73% reported it be in a very poor state. One of the key limitations of the 8-4-4 system of education has been the much focus on academic excellence at the expense of skill acquisition which has seen more preference for teacher-centred teaching approaches and rote learning which completely fail to factor the use of resources and facilities. This has really resulted to vocational subjects such as agriculture losing their true vocational meaning. A study by Konyango and Asienyo (2015) established that fundamental facilities such as the tractors and tractor drawn implements that had been donated to the pioneering schools for the implementation of vocational agriculture were covered in thick bushes.

4.8.4 Willingness to Venture into Agriculture Career

According to Kyule (2017), school agriculture should prepare students for entry into the agricultural value chain. This study aimed at establishing the willingness of students to

venture into agricultural career upon graduating from secondary school based on the level of skills they had acquired from engaging in practical agriculture at school. Figure 23 presents the analysed results.

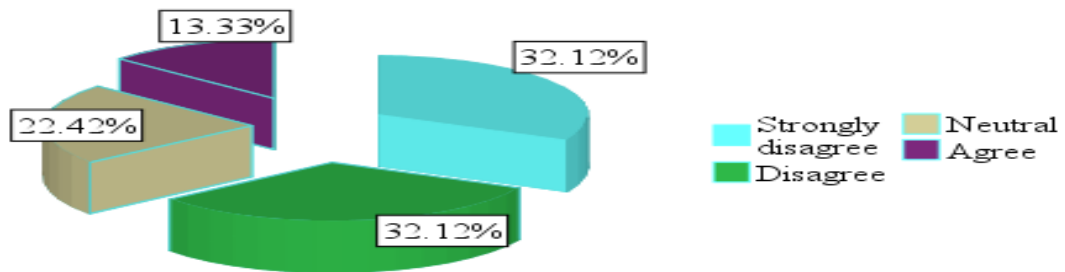


Figure 23: Willingness to Venture into Agriculture

It was quite ironical that majority of the students (32.12%) strongly disagreed with a similar percentage disagreeing and only a paltry 13.33% agreeing. It was surprising that no student strongly agreed to the statement. The unwillingness of majority of the students to venture into agriculture is hinged on the low level of practical skills as this study has established. The findings resonate those from Sebotsa et al. (2021) that the youth tend to shy away from agriculture; inclusive of those who studied agriculture up to form four level. Such youth would be more willing and ready to find white collar jobs which are rather becoming scarce and this consequently leads to the high unemployment that Kenya is currently facing. Equipping the students with agricultural skills can perhaps be a panacea to this problem.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter presented summary of the results, conclusions and recommendations in line with Chapter Four.

5.2 Summary of Results

One of the objectives of teaching agriculture in secondary schools is to equip learners with relevant skills that can enable them to contribute to the agricultural value chain. The practical implementation of agriculture demands an array of facilities and resources, the school farm being one of them. This study therefore sought to determine the relationship between selected school farm factors and the acquisition of agricultural skills among secondary school students in Malava Sub-County, Kakamega County, Kenya. The selected school farm factors were; availability, level of accessibility, level of adequacy and level of utilization.

Correlational research design was adopted. The accessible population comprised of 171 teachers of agriculture and 2532 students of agriculture sampled from 15 schools. To ensure equal representation of all categories of schools so as to avoid bias, 9 Sub-County, 4 County and 2 Extra-County schools were selected. Yamane formula was employed in coming up with 150 agriculture students with an additional 15 to take care of any case of non-response. Proportionate sampling was used to select the students. Through purpose sampling, one teacher of agriculture was selected from each school. Therefore, a total of 180 respondents participated in the study.

Questionnaires and an observation guide were used to solicit data. Questionnaires solicited data from both sets of respondents. The observation guide on the other hand was employed in soliciting data pertaining to the availability of the school farm facilities and status of projects and demonstrations in sampled schools. The analysed data was presented in form of percentages, frequencies and means. The inferential statistic tool used was chi-square test for relationship..

With reference to the first objective which aimed at determining the relationship between availability of the school farm and level of acquisition of agricultural skills, no statistically significant relationship existed between the two variables. It was established that all sampled schools had a farm. There were however variations in the availability status of the various facilities. Museum plots were the least available facility as they only existed in 20% of the schools while project plots were the most available facility as they existed in all the schools.

Result analysis from the second objective which was to determine relationship between level of access to the school farm and level of acquisition of agricultural skills revealed a statistically significant

relationship. Despite these farms being in close proximity to the schools, students' level of access was generally low especially during agriculture lessons, tea breaks and lunch breaks. Among the major reasons for the low level of access, allocation of project plots to the form four candidates was reported by majority (93.0%) of students and 53.3% of the teachers. Time limitation was also reported by 86.6% of the student respondents and 100% of the teachers.

Result analysis from third objective which aimed at determining relationship between the level of adequacy of the school farm and the acquisition of agricultural skills revealed a significant relationship between the two variables. Class size of more than 40 students was common in majority of the schools (46.67) with all the Sub-County schools having large class size. All the students reported to have never been allocated individual plots. Only 24.9% of the respondents reported having been allocated plots in groups, out of which 26.83% reported to have been in groups of 6-10 while the majority (73.17%) reported to have been in groups of more than ten. With large group sizes of more than ten students, practical implementation of agriculture using the school farm may not be achieved. It was however quite surprising that the commercial farm was adequate as reported by 53.3% of the teachers and 55.7% of the students. Students in form three and one were hardly involved in school farm operations which denies them the opportunity to acquire agricultural skills.

The fourth objective sought to establish relationship between level of utilization of the school farm and the level of acquisition of agricultural skills. Results from the chi-square test for relationship revealed a significant relationship between these two variables. Most students (54.5%) reported that they do not utilize the school farm for instructional purposes while 45.5% reported to having done it. Utilization of the commercial section and museum plots was generally low among most students. It was also worth noting that utilization of the school farm during agriculture lessons was very low with a mean of 1.48 and this was attributed to time limitation on the timetable. Most students (77.6%) reported never having utilized the school farm for instructional purposes since joining form one.

5.3 Conclusions

The following conclusions were drawn in line with the study findings:

- i. Availability of the school farm had no significant relationship to the level of acquisition of agricultural skills.
- ii. Level of access to the school farm had a significant relationship to the level of acquisition of agricultural skills.
- iii. Level of adequacy of the school farm had a significant relationship to the level of acquisition of agricultural skills

- iv. Level of utilization of the school farm had a significant relationship to the level of acquisition of agricultural skills.

5.4 Recommendations

With respect to the conclusions the study made the following recommendations:

- i. Teachers of agriculture as the curriculum implementers with support from the school management should work towards setting up various facilities such as project plots, demonstration plots, museum plots and farm structures for practical implementation of agriculture.
- ii. The Ministry of Education should allocate more time to agriculture on the timetable coupled with the introduction of double lessons once per week as it had earlier been prior to the 2002 educational reforms. In schools, the directors of studies who are tasked with timetabling should make efforts to timetable agriculture lessons before sessions such as tea breaks and lunch breaks to enhance accessibility level of the school farm.
- iii. School management through the principals should strive to improve on level of adequacy of the school farm facilities such as museum plots, demonstration plots, project plots and farm structures through securing of additional land to set up these facilities through such means as leasehold or purchase from the neighbourhood.
- iv. Teachers of agriculture as the curriculum implementers need to improve on utility level of the school farm by strictly adhering to the agriculture syllabus guidelines of implementing the agriculture curriculum in a holistic manner to cover both theory and practical aspects.

5.5 Suggestions for Further Studies

Based on the research gaps, the study recommended research to be conducted in the following areas:

- i. Following the change in education system, a similar study needs to be conducted to determine the contribution of these school farm factors on the implementation of the Competency Based Agriculture curriculum at the junior secondary school level where the subject is considered core.
- ii. Determine the teachers' level of competency in the practical implementation of the agriculture curriculum using the school farm.
- iii. Level of preparedness of secondary schools towards the implementation of CBA with the same school farm facilities.

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APPENDICES

Appendix A: Agriculture Students' Questionnaire

Introduction

Dear respondent,

I'm a Masters' student at Egerton University carrying out a study entitled 'relationship between school farm factors and the acquisition of agricultural skills among secondary school students in Malava Sub-County'. Information generated from this study may enable education stakeholders to formulate policies geared towards improving availability status, access, adequacy and utilization of the school farm facilities to ensure a practical approach to the teaching of agriculture for purposes of agricultural skill acquisition. Having been chosen to participate in this study, your opinions are highly needed. Kindly fill the questionnaire to the best of your knowledge. The information you provide here will solely be used for research purposes and therefore only privy to the researcher.

Thanks in advance.

Recha O. Robert

SECTION A: DEMOGRAPHIC INFORMATION

1. Indicate your gender

Male

Female

2. Indicate your school category

County

Extra-County

Sub-County

SECTION B: AVAILABILITY OF THE SCHOOL FARM

3a). Does a farm exist in your school?

Yes

No

b). In case the answer is no, is there an alternative farm for practical agricultural activities?

Yes

No

4. Does the school farm have the following facilities for teaching practical agriculture? (Place a tick against those that are available in your school)

Museum plots

- Project plots
- Commercial farm
- Demonstration plots
- Farm Structures

5. A museum plot is a section within the school farm reserved for growing crops that are not commonly grown in a particular ecological region but have been included in the agriculture syllabus. Select by ticking against the crops that are grown on your schools' museum plot.

Crop	Availability	
	Yes	No
Coffee		
Tea		
Rice		
Pyrethrum		
Millet		
French beans		
Cotton		
Any other (Specify)		

6a) Are the following types of structures and buildings in your school farm?

Structures and buildings	Availability	
	Yes	No
Dwelling houses for farm workers		
Storage structures		
Sheds for equipment and machinery		
Workshops- For repair and maintenance of tools and equipment		
Structures for holding and keeping animals		

b). Are the following types of structures for holding and keeping livestock on your school farm?

Tick which ever applies

- Crushes Rabbit hutches Dairy parlour Poultry houses Bee hives Pig sty Poultry houses Zero grazing unit Fish ponds Spray race Calf pens Cattle Dips Goat or sheep pen

c). Are the following storage structures on your school farm? Tick as applies

- Crib
- Silo
- Farm store
- Any other (Specify)-----

SECTION C: LEVEL OF ACCESS TO THE SCHOOL FARM

7a). Specify where is the school farm located

- Within the school compound
- Adjacent to the school
- Away from the school

b). In case the farm is not located within the school compound, indicate the approximate distance to the facility in metres

- Less than one Kilometre
- One Kilometre
- More than one kilometre

8. (a). Based on the location from the school, how frequently do you visit the school farm?

- Annually
- Termly
- Monthly
- Weekly
- Daily

b). Indicate how frequently you access the school farm during the following sessions;

Session	Frequency of access to the school farm				
	Never	Rarely	Sometimes	Often	Very often
	1	2	3	4	5
During tea break					
During lunch break					
During the agriculture lessons					
In the evening after classes					
In the morning before classes					
During weekends					

SECTION D: LEVEL OF ADEQUACY OF THE SCHOOL FARM

10. What is the number of students of agriculture in your class?

- Below 25
- 26-40
- More than 40

11a) How often have you been allocated an individual plot for carrying out agricultural activities?

- Never
- Rarely
- Sometimes
- Often
- Very often

b). How often have you been assigned a plot to carry out the activities in groups?

- Never
- Rarely
- Sometimes
- Often
- Very often

c). If yes, what is the size of each group?

- Less than 5 students
- 6-10students
- More than 10 students

12. a) Does an active Young Farmers' Club exist in your school?

- Yes
- No

b). Have YFCK members been allocated a section of the school farm?

- Yes
- No

13. Rate adequacy level of these school farm sections

Section	Level of adequacy				
	Not available	Inadequate	Slightly adequate	Somewhat Adequate	Very adequate
	1	2	3	4	5
Project plots (A section where students carry out their projects)					
Demonstration plots (Section used to compare approved practices with					

the outdated or less accepted technologies)					
Museum plots (Section for growing exotic varieties of crops)					
Commercial farm (Section for growing crops or rearing animals for sale)					

SECTION E: FREQUENCY OF UTILIZATION OF THE SCHOOL FARM

13. Do you utilize the school farm when learning agriculture?

Yes

No

14.a) Indicate how often the school farm is utilized for carrying out the following agricultural activities

Agricultural activity	Frequency of utilization					
	Never	Annually	Termly	Monthly	Weekly	Daily
	1	2	3	4	5	6
Demonstrations						
Student projects						
Growing crops for sale						
Crop museum						
Livestock production						
Any other use (Specify)						

b). How conveniently do you utilize the school farm for practical activities?

Time/Session	Frequency of utilization of the school farm				
	Never	Rarely	Sometimes	Often	Very often
	1	2	3	4	5
During tea break					
During lunch break					
During the agriculture lessons					
In the evening after classes					
In the morning before classes					
During weekends					
Any other time (Specify)					

c). For the three years you have been in secondary school, in which form did you most frequently utilize the school farm?

- Form One
- Form Two
- Form Three
- None of these forms

SECTION F: LEVEL OF ACQUISITION OF AGRICULTURAL SKILLS

15. Indicate your level of exposure to the following practical field activities as well as the level of skills you have acquired from the exposure.

Practical Field activity	Level of exposure				Level of skills acquired		
	Least	Low	Moderate	High	Below average	Average	Above average
	1	2	3	4	1	2	3
Carrying out projects in the project plots.							
Demonstrations in the school farm							
Observing what is done in the school farm by farm workers							
Visiting outstanding farmers / agricultural institutions in the neighborhood.							
Carrying out farming at home							

16. Kindly indicate by ticking against the level of skills you have acquired from conducting the following practical activities on the school farm.

Form	Practical activity	Yes	No	Level of skills acquired		
				Below average	Average	Above average
				1	2	3

One	Identification, use and maintenance of farm tools and equipment					
	Land preparation (primary, secondary and tertiary cultivation)					
	Preparation of manure (farmyard, green and compost manure).					
	Irrigation					
	Identification and description of various livestock breeds					
	Comparing capillary, color, texture and porosity of different types of soils.					
	Testing for the presence of living organisms, water and air in soil					
Two	Production of vegetable crops which include: tomatoes, carrots, cabbages and bulb onions					
	Preparation of planting materials e.g chitting, breaking seed dormancy					
	Establishment and management of nurseries					
	Grafting, Budding, Layering and tissue culture					
	Routine field practices e.g. thinning, gapping and training					
	Coffee and tea pruning					
	Soil sampling and testing					
	Controlling internal and external parasites					
	Computation of livestock ration					
Three						
	Production of field crops (maize, beans, rice, millet and sorghum)					
	Harvesting of selected industrial crops (Cotton, Pyrethrum, Sugarcane, Tea and Coffee).					
	Pasture establishment, classification and management					

Construction and maintenance of farm structures					
Control of soil erosion and conservation of water					
Designing and constructing micro-catchment					
Weeds identification, classification and control					
Rearing a given species of livestock and carrying out all the necessary routine livestock management practices					
Management of bees in a beehive and fish in a fish pond					
Parasite control measures such as deworming, spraying, etc					
Dehorning					
Livestock identification techniques					
Selection of breeding stock					
Disease control measures such as administration of vaccines					
Hoof trimming					

17. Rate the status of projects and demonstrations on your school farm.

- Very Poor
- Poor
- Average
- Good
- Very Good

18. Based on your level of agricultural skill acquisition, you will be in a position to venture into a career in agriculture upon graduating from secondary school.

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Appendix B: Questionnaire for the Teachers of Agriculture

Introduction

Dear respondent

I'm a Masters' student at Egerton University carrying out a study entitled 'relationship between school farm factors and the acquisition of agricultural skills among secondary school students in Malava Sub-County'. Information generated from this study may enable education stakeholders to formulate policies geared towards improving availability status, access, adequacy and utilization of the school farm facilities to ensure a practical approach to the teaching of agriculture for purposes of agricultural skill acquisition. Having been chosen to participate in this study, your opinions are highly needed. Kindly fill the questionnaire to the best of your knowledge. The information you provide here will solely be used for research purposes and therefore only privy to the researcher.

Thanks in advance.

Recha O. Robert

SECTION A: DEMOGRAPHIC INFORMATION

1. Indicate your gender

Male

Female

2. Indicate your age.....

3. Indicate the category under which your school belongs.

Extra-County

County

Sub-County

4. Kindly indicate your highest academic qualification

Diploma

Bachelors' degree

Masters' degree

PhD

Any other (Specify).....

5. What is your teaching experience?

Less than one year

1-5 years

More than 5 years

6. What are your terms of employment?

- Contract
- Permanent and pensionable

7. Apart from agriculture, which other subject do you teach?.....

SECTION B: AVAILABILITY OF THE SCHOOL FARM

8. a) Does a farm exist in your school??

- Yes
- No

b) In case the answer is no, is there an alternative farm for practical agricultural activities?

- Yes
- No

9a) Does the farm have the following facilities? (Place a tick against those found in your school)

- Museum plots
- Project plots
- Commercial farm
- Demonstration plots
- Farm Structures

b) A museum plot is a section within the school farm reserved for growing crops that are not commonly grown in a particular ecological region but have been included in the agriculture syllabus. Select by ticking against the crops that are grown on your schools' museum plot.

Crop	Availability	
	Yes	No
Coffee		
Tea		
Rice		
Pyrethrum		
Millet		
French beans		
Cotton		
Any other (Specify)		

10a). Are the following types of structures and buildings in your school farm?

Structures and buildings	Availability	
	Yes	No

Dwelling houses for farm workers		
Storage structures		
Sheds for equipment and machinery		
Workshops- For repair and maintenance of tools and equipment		
Structures for holding and keeping animals		

b) Are the following types of structures for holding and keeping livestock on your school farm. Tick which ever applies

- Dairy cattle Beef cattle Fish Sheep Goats Bees Camels Rabbits Poultry
 Pigs

c). Are the following storage structures on your school farm? Tick as applies

- Crib
 Silo
 Farm store
 Any other (Specify).....

SECTION C: LEVEL OF ACCESS TO THE SCHOOL FARM

11a). Specify where is the school farm located

- Within the school compound
 Adjacent to the school
 Away from the school

b). In case the farm is not located within the school compound, indicate the approximate distance to the facility

- Less than one Kilometre
 One kilometre
 More than one Kilometre

12a). Based on the location from the school, how frequently do your students visit the school farm?

- Annually
 Termly
 Monthly
 Weekly
 Daily

b). Indicate how frequently your students access the school farm during the following sessions;

Session	Frequency of access to the school farm				
	Never	Rarely	Sometimes	Often	Very often

	1	2	3	4	5
During tea break					
During lunch break					
During the agriculture lessons					
In the evening after classes					
In the morning before classes					
During weekends					

SECTION D: LEVEL OF ADEQUACY OF THE SCHOOL FARM

14. Approximate the size of the farm allocated to the students in acres?

.....

.....

.....

15. How many students of agriculture are there in form three in your school?

- Below 25
- 26-40
- More than 40

16.a) How often have you allocated plots to individual students for carrying out agricultural activities?

- Never
- Rarely
- Sometimes
- Often
- Very often

b). How often have you assigned plots to students in groups?

- Never
- Rarely
- Sometimes
- Often
- Very often

c). If yes, what is the size of each group?

- Less than 5 students
- 6-10students
- More than 10 students

17. Rate adequacy level these school farm sections

Section	Level of adequacy		
	Not available	Inadequate	Adequate
	1	2	3
Project plots			
Museum plots			
Commercial farm			
Demonstration plots			

18). a) Does the size of the school farm allocated to students accommodate for KNEC projects and still remain for project activities among the other classes?

- Yes
 No

b) Tick in ascending order the class that is more exposed to the school farm.

(1-most exposed 4-the least exposed)

Form	Highly exposed	Moderately exposed	Lowly exposed	Least exposed
	4	3	2	1
One				
Two				
Three				
Four				

SECTION E: FREQUENCY OF UTILIZATION OF THE SCHOOL FARM

19. Do you utilize the school farm for teaching agriculture?

- Yes
 No

20. Indicate how often the school farm is utilized for carrying out the following agricultural activities

Agricultural activity	Frequency of utilization					
	Never	Annually	Termly	Monthly	Weekly	Daily

	1	2	3	4	5	6
Demonstrations						
Student projects (Excluding KNEC projects)						
Growing crops for sale						
Crop museum						
Livestock production						
Any other use (Specify)						

b). How conveniently do your learners make use of the school farm for practical activities?

Time/Session	Frequency of utilization of the school farm				
	Never	Rarely	Sometimes	Often	Very often
	1	2	3	4	5
During tea break					
During lunch break					
During the agriculture lessons					
In the evening after classes					
In the morning before classes					
During weekends					

SECTION F: LEVEL OF ACQUISITION OF AGRICULTURAL SKILLS

21. Indicate your form three agriculture students' level exposure to the following practical field activities as well as the level of skills they have acquired from the exposure.

Practical Field activity	Level of exposure				Level of skills acquired		
	Least	Low	Moderate	High	Below average	Average	Above average
	1	2	3	4	1	2	3
Carrying out projects in the project plots.							
Demonstrations in the school farm							
Observing what is done in the school farm by farm workers							
Visiting outstanding farmers / agricultural institutions in the neighbourhood.							

Carrying out farming at home							
------------------------------	--	--	--	--	--	--	--

22. Kindly indicate by ticking against the level of skills your students have acquired from conducting the following practical activities on the school farm.

Form	Practical activity	Yes	No	Level of skills acquired		
				Below average	Average	Above average
				1	2	3
One	Identification, use and maintenance of farm tools and equipment					
	Land preparation (primary, secondary and tertiary cultivation)					
	Preparation of manure (farmyard, green and compost manure).					
	Irrigation					
	Identification and description of various livestock breeds					
	Comparing capillary, colour, texture and porosity of different types of soils.					
	Testing for the presence of living organisms, water and air in soil					
Two	Production of vegetable crops which include: tomatoes, carrots, cabbages and bulb onions					
	Preparation of planting materials e.g chitting, breaking seed dormancy					
	Establishment and management of nurseries					
	Grafting, Budding, Layering and tissue culture					
	Routine field practices e.g. thinning, gapping and training					
	Coffee and tea pruning					
	Soil sampling and testing					

	Controlling internal and external parasites					
	Computation of livestock ration					
Three	Production of field crops (maize, beans, rice, millet and sorghum)					
	Harvesting of selected industrial crops (Cotton, Pyrethrum, Sugarcane, Tea and Coffee).					
	Pasture establishment, classification management and utilization					
	Construction and maintenance of farm structures					
	Control of soil erosion and conservation of water					
	Designing and constructing micro-catchment					
	Weeds identification, classification and control					
	Rearing a given species of livestock and carrying out all the necessary routine livestock management practices					
	Management of bees in a beehive and fish in a fish pond					
	Parasite control measures such as deworming, spraying, etc					
	Dehorning					
	Livestock identification techniques					
	Selection of breeding stock					
	Disease control measures such as administration of vaccines					
	Hoof trimming					

23. Rate the status of projects and demonstrations on your school farm.

- Very Poor
- Poor
- Average
- Good
- Very Good

24. The level of skills your learners acquire from conducting practical activities on the school farm are adequate to place them in a position to venture into a career in agriculture upon graduating from secondary school

- Strongly agree
- Agree
- Neutral
- Disagree
- Strongly disagree

Appendix C: Observation Guide

AVAILABILITY OF THE SCHOOL FARM

1. Physical presence of a school farm

Yes

No

2. Availability status and level of adequacy of various sections on the school farm

Facility/Section	Size	Availability status		Level of adequacy		
		Yes	No	Inadequate	Moderate	Adequate
				1	2	3
Project plots						
Museum plots						
Commercial farm						
Demonstration plots						

3. Crops found on the crop museum section

Crop	Availability	
	Yes	No
Coffee		
Tea		
Rice		
Pyrethrum		
Millet		
Cabbages		
French beans		
Cotton		

4. Structures and buildings on the school farm

Structures and buildings	Availability	
	Yes	No
Dwelling houses for farm workers		
Storage structures		
Sheds for equipment and machinery		

Workshops- For repair and maintenance of tools and equipment		
Structures for holding and keeping animals		

LEVEL OF ACCESS TO THE SCHOOL FARM FACILITY

1. Location of the school farm

- Within the school compound
- Adjacent to the school
- Away from the school

2. Approximate distance of the school farm from the tuition block.....

3. Any evidence indicating that students regularly visit the school farm.....

LEVEL OF ADEQUACY OF THE SCHOOL FARM

1. Approximate size of the school farm allocated to the learners in acres.....

2. Total number of form three students who have selected agriculture subject.....

3. Allocation of project plots to individual students

- Yes
- No

4. Allocation of project plots to students in groups

- Yes
- No

5. Average size of plot allocated to each learner.....

FREQUENCY OF UTILIZATION OF THE SCHOOL FARM

1. Any evidences proving that students regularly utilize the school farm for conducting projects and demonstrations

.....

.....

.....

LEVEL OF ACQUISITION OF AGRICULTURAL SKILLS

1. Availability and general status of the projects and demonstrations in both crop and livestock production initiated by the students on the school farm

Type of project/Demonstration	Availability		Status of the Project/Demonstration				
	Yes	No	Very Poor	Poor	Average	Good	Very good
			1	2	3	4	5


Projects in livestock production							
Demonstrations in livestock production							
Projects in crop production							
Demonstrations in crop production							

**APPENDIX D: LEARNERS' SKILL LEVEL ON PRACTICAL ACTIVITIES
RECOMMENDED IN THE SYLLABUS**

Skill level on	N	Minimum	Maximum	Mean	Std. Deviation
Identification, use and maintenance of farm tools and equipment	165	1.0	3.0	1.552	.6478
Land preparation	165	1.0	3.0	1.636	.5532
Manure preparation	165	1.0	2.0	1.267	.4436
Irrigation	165	1.0	1.0	1.000	.0000
Identification and description of various livestock breeds	165	1.0	3.0	2.612	.6007
Soil physical properties	165	1.0	3.0	1.721	.8380
Testing for the presence of water, living organisms and water in soil	165	1.0	3.0	1.412	.8114
Vegetable production	165	1.0	3.0	1.739	.6038
Preparation of planting materials	165	1.0	2.0	1.333	.4728
Establishment and management of nurseries	165	1.0	3.0	1.715	.6608
Grafting, budding, layering and tissue culture	165	1.0	2.0	1.267	.4436
Routine field practices	165	1.0	3.0	1.606	.6217
Tea and coffee pruning	165	1.0	2.0	1.133	.3410
Soil sampling and testing	165	1.0	3.0	1.412	.7240
Parasite control	165	1.0	3.0	1.758	.6064
Computation of livestock ration	165	1.0	2.0	1.067	.2502

Production of field crops	165	1.0	2.0	1.067	.2502
Harvesting industrial crops	165	1.0	2.0	1.267	.4436
Pasture establishment, classification and management	165	1.0	2.0	1.400	.4914
Construction and maintenance of farm structures	165	1.0	3.0	1.861	.6138
Control of soil erosion and water conservation	165	1.0	3.0	2.267	.8563
Designing and constructing micro-catchments	165	1.0	3.0	1.224	.5560
Weed identification, classification and control	165	1.0	3.0	2.703	.5867
Rearing a given livestock species	165	1.0	3.0	1.800	.9120
Apiculture and aquaculture	165	1.0	1.0	1.000	.0000
Dehorning	165	1.0	3.0	1.400	.6129
Livestock identification techniques	165	1.0	3.0	2.012	.9815
Selection and breeding	165	1.0	2.0	1.406	.4926
Disease control measures	165	1.0	3.0	1.782	.5188
Hoof trimming	165	1.0	3.0	1.424	.5427

Appendix E: Introductory Letter from the Graduate School

EGERTON Tel. Pilot: 254-51-2217620 254-51-2217877 254-51-2217631 Dir. line/Fax: 254-51-2217847 Cell Phone		UNIVERSITY P.O. Box 536 - 20115 Egerton, Njoro, Kenya Email: bpgs@egerton.ac.ke www.egerton.ac.ke
---	---	---

OFFICE OF THE DIRECTOR GRADUATE SCHOOL

ESM11/14718/18 Ref:.....	19 th September, 2023 Date:.....
-----------------------------	--

Mr. Robert Ouko Recha
Dept. of AGED
Egerton University,
P. O. Box 536,
EGERTON.

Dear Mr. Recha

RE: CORRECTED PROPOSAL

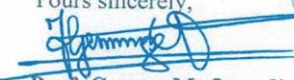
This is to acknowledge receipt of soft copies of your corrected proposal entitled
“Relationship between Selected School Farm Factors and the Acquisition of
Agricultural Skills among Secondary School Students in Malava Sub- County,
Kakamega County, Kenya”


You are now at liberty to commence your fieldwork. However note the following: -

1. You must register each semester.
2. Pay your fees every semester.
3. Submit progress reports every four (4) months (Masters) or six (6) months (PhDs). Without this, your thesis/project will not be accepted. Forms are available at the Board.
4. You are expected to publish one (1) paper (Masters) or two (2) papers (PhD) in peer-reviewed journal and present them before issuance of “Intent to Submit Thesis/Project” form by the Board.

NB: Please provide a **HARD COPY** of the proposal duly signed by the supervisors for the file.

Thank you.

Yours sincerely,

Prof. George M. Ogendi, Ph.D
DIRECTOR, BOARD OF POSTGRADUATE STUDIES



c.c. Dean, FEDCOS
~~COD, AGED~~
Supervisors “Transforming Lives Through Quality Education”

GMO/mm

Appendix F: Ethical Approval from Egerton University

EGERTON

TEL: (051) 2217808
FAX: 051-2217942



UNIVERSITY

P. O. BOX 536
EGERTON

**EGERTON UNIVERSITY INSTITUTIONAL SCIENTIFIC AND ETHICS
REVIEW COMMITTEE**

EU/RE/DIR/009

Approval No. EUISERC/APP/282/2023

9th October 2023

Robert Ouko Recha
P.O BOX 393-50103,
Kakamega.
Telephone: 0714988375.
E-mail: recharobert@gmail.com

Dear Robert,

**RE: ETHICAL APPROVAL: RELATIONSHIP BETWEEN SELECTED SCHOOL FARM
FACTORS AND THE ACQUISITION OF AGRICULTURAL SKILLS AMONG
SECONDARY SCHOOL STUDENTS IN MALAVA SUB-COUNTY, KAKAMEGA
COUNTY, KENYA**

This is to inform you that the *Egerton University Institutional Scientific and Ethics Review Committee* has reviewed and approved your above research proposal. Your application approval number is *EUISERC/APP/282/2023*. The approval period is *9th October, 2023 –10th October, 2024*

This approval is subject to compliance with the following requirements;

- i. Only approved documents including (informed consents, study instruments, MTA) will be used.
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by *Egerton University Institutional Scientific and Ethics Review Committee*.
- iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to *Egerton University Institutional Scientific and Ethics Review Committee* within 72 hours of notification
- iv. Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to *Egerton University Institutional Scientific and Ethics Review Committee* within 72 hours.
- v. Clearance for Material Transfer of biological specimens must be obtained from relevant institutions.

“Transforming Lives through Quality Education”

- vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- vii. Submission of an executive summary report within 90 days upon completion of the study to *Egerton University Institutional Scientific and Ethics Review Committee*.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) <https://oris.nacosti.go.ke> and also obtain other clearances needed.

Yours sincerely,








Prof. Raphael M. Ngure

**CHAIRMAN, EGERTON UNIVERSITY INSTITUTIONAL SCIENTIFIC AND ETHICS
REVIEW CTTEE**

RMN/BK/

"Transforming Lives through Quality Education"

Appendix G: Research Permit from National Commission for Science, Technology And Innovation (NACOSTI)

 REPUBLIC OF KENYA	 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Ref No: 338476	Date of Issue: 15/November/2023
RESEARCH LICENSE	
	
<p>This is to Certify that Mr.. Robert Ouko Recha of Egerton University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in on the topic: RELATIONSHIP BETWEEN SELECTED SCHOOL FARM FACTORS AND THE ACQUISITION OF AGRICULTURAL SKILLS AMONG SECONDARY SCHOOL STUDENTS IN MALAVA SUB-COUNTY, KAKAMEGA COUNTY, KENYA for the period ending : 15/November/2024.</p>	
License No: NACOSTI/P/23/31541	
338476 Applicant Identification Number	 Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
	Verification QR Code 
<p>NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.</p>	
See overleaf for conditions	

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013 (Rev. 2014)
Legal Notice No. 108: The Science, Technology and Innovation (Research Licensing) Regulations, 2014

The National Commission for Science, Technology and Innovation, hereafter referred to as the Commission, was established under the Science, Technology and Innovation Act 2013 (Revised 2014) herein after referred to as the Act. The objective of the Commission shall be to regulate and assure quality in the science, technology and innovation sector and advise the Government in matters related thereto.

CONDITIONS OF THE RESEARCH LICENSE

1. The License is granted subject to provisions of the Constitution of Kenya, the Science, Technology and Innovation Act, and other relevant laws, policies and regulations. Accordingly, the licensee shall adhere to such procedures, standards, code of ethics and guidelines as may be prescribed by regulations made under the Act, or prescribed by provisions of International treaties of which Kenya is a signatory to
2. The research and its related activities as well as outcomes shall be beneficial to the country and shall not in any way;
 - i. Endanger national security
 - ii. Adversely affect the lives of Kenyans
 - iii. Be in contravention of Kenya's international obligations including Biological Weapons Convention (BWC), Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), Chemical, Biological, Radiological and Nuclear (CBRN).
 - iv. Result in exploitation of intellectual property rights of communities in Kenya
 - v. Adversely affect the environment
 - vi. Adversely affect the rights of communities
 - vii. Endanger public safety and national cohesion
 - viii. Plagiarize someone else's work
3. The License is valid for the proposed research, location and specified period.
4. The license any rights thereunder are non-transferable
5. The Commission reserves the right to cancel the research at any time during the research period if in the opinion of the Commission the research is not implemented in conformity with the provisions of the Act or any other written law.
6. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research.
7. Excavation, filming, movement, and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
8. The License does not give authority to transfer research materials.
9. The Commission may monitor and evaluate the licensed research project for the purpose of assessing and evaluating compliance with the conditions of the License.
10. The Licensee shall submit one hard copy, and upload a soft copy of their final report (thesis) onto a platform designated by the Commission within one year of completion of the research.
11. The Commission reserves the right to modify the conditions of the License including cancellation without prior notice.
12. Research, findings and information regarding research systems shall be stored or disseminated, utilized or applied in such a manner as may be prescribed by the Commission from time to time.
13. The Licensee shall disclose to the Commission, the relevant Institutional Scientific and Ethical Review Committee, and the relevant national agencies any inventions and discoveries that are of National strategic importance.
14. The Commission shall have powers to acquire from any person the right in, or to, any scientific innovation, invention or patent of strategic importance to the country.
15. Relevant Institutional Scientific and Ethical Review Committee shall monitor and evaluate the research periodically, and make a report of its findings to the Commission for necessary action.

National Commission for Science, Technology and
Innovation(NACOSTI),
Off Waiyaki Way, Upper Kabete,
P. O. Box 30623 - 00100 Nairobi, KENYA
Telephone: 020 4007000, 0713788787, 0735404245
E-mail: dg@nacosti.go.ke
Website: www.nacosti.go.ke

Appendix H: Authorization Letter from the Kakamega County Director of Education

REPUBLIC OF KENYA



MINISTRY OF EDUCATION
STATE DEPARTMENT FOR BASIC EDUCATION

Telephone:
Fax:
E-mail: wespropde@yahoo.com
When replying please quote our Ref.

County Director of Education
Kakamega County
P. O. BOX 137 - 50100
KAKAMEGA

REF: KAKA/C/GA/29/17/VOL.VI/254

19th Nov, 2023

MR. ROBERT OUKO RECHA
EGERTON UNIVERSITY

RE: RESEARCH AUTHORIZATION

Reference is made to a letter from NACOSTI Ref No: NACOSTI/P/23/31541 dated 15th November, 2023 concerning subject matter.

This is to inform you that you have been authorized to carry out research on '**Relationship between selected school farm factors and the acquisition of agricultural skills among secondary school students in Malava, Kakamega County**', for the period ending 15th November, 2024.

Please accord him/her any necessary assistance he/she may require.

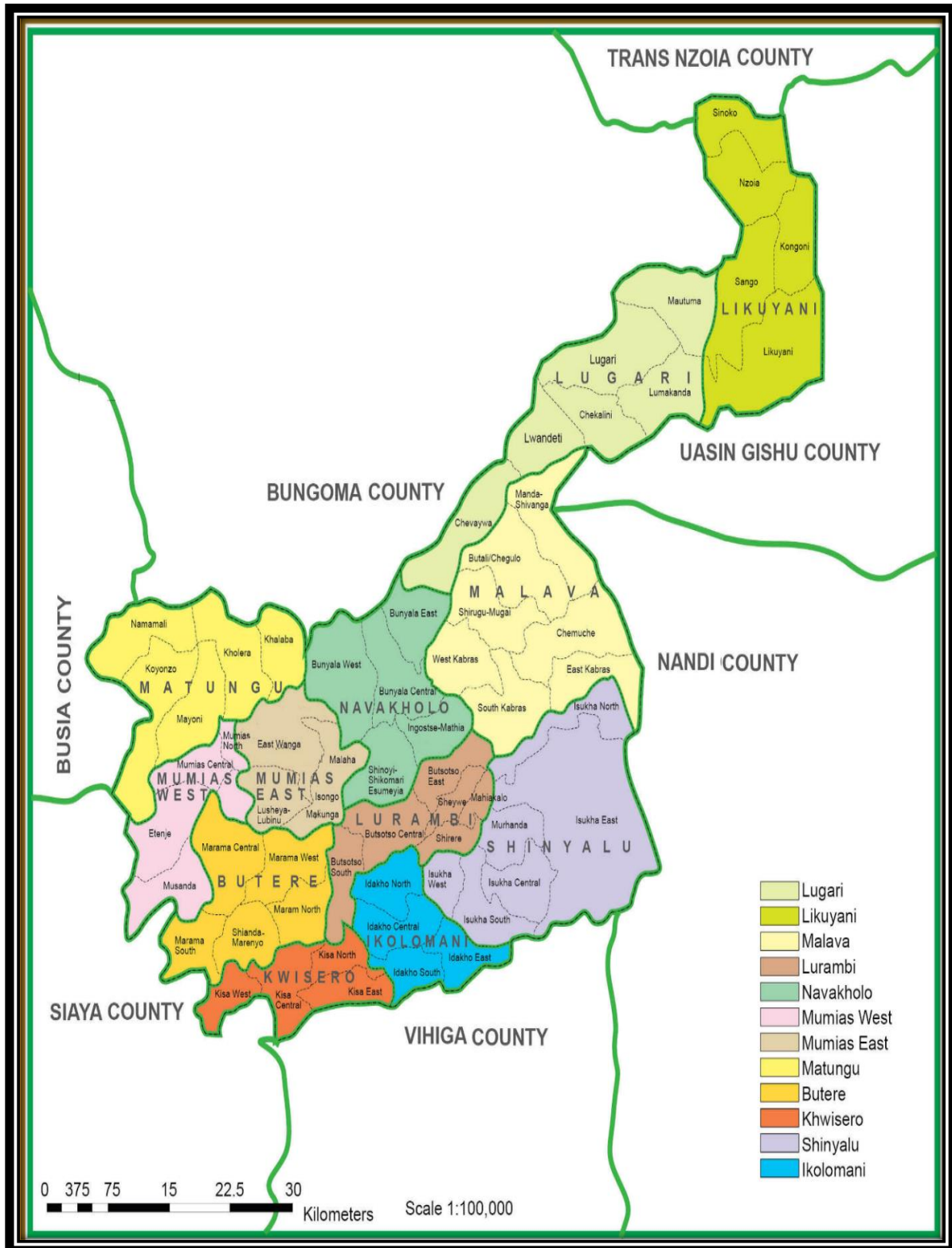
FOR
COUNTY DIRECTOR OF EDUCATION
KAKAMEGA COUNTY

HELLEN NYANGAU
COUNTY DIRECTOR OF EDUCATION
KAKAMEGA COUNTY

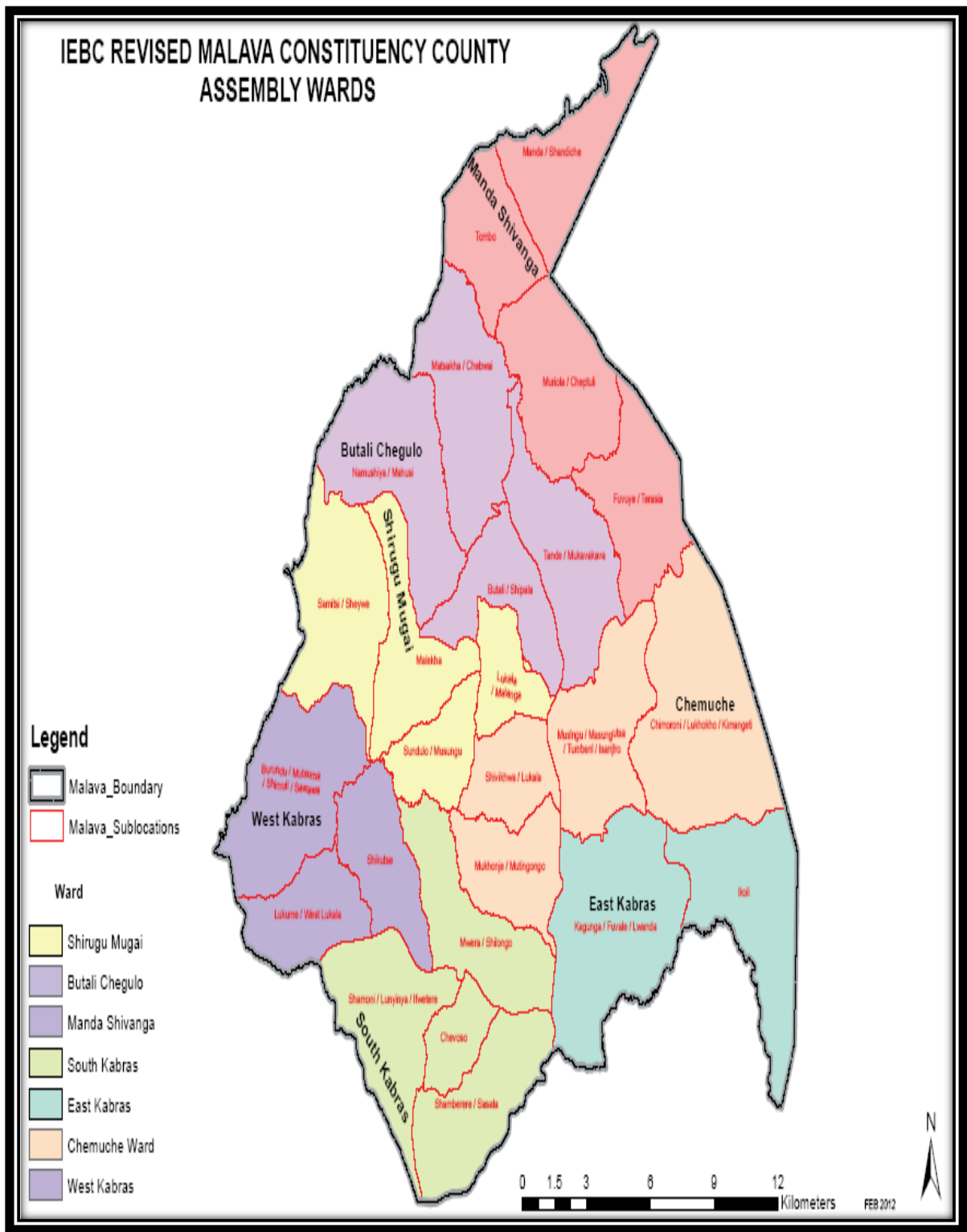
Copy to:

The Regional Director of Education
WESTERN REGION

Appendix I: Map of Kakamega County



Appendix J: Map of Malava Sub-County



Appendix K: Abstracts of the Published Papers

Publication 1

2020-2022, Vol. 3 (1) 2024

Level of Access to the School Farm and the Acquisition of Agricultural Skills among Secondary School Students in Malava Sub-County, Kakamega County, Kenya

Level of Access to the School Farm and the Acquisition of Agricultural Skills among Secondary School Students in Malava Sub-County, Kakamega County, Kenya

Robert O. Recha^{1*}, Miriam N. Kyalo² & Lydia N. Kinuthia³

^{1,2}Department of Agricultural Education and Extension, Egerton University, Kenya

²Department of Textile Technology, Kirinyaga University, Kenya

*Corresponding author: recharobert@gmail.com

<https://doi.org/10.62040/jkncu.v5i1.193>

Abstract

One of the objectives of teaching Agriculture at the secondary school level is to equip learners with practical agricultural skills as this is considered one of the ultimate panacea to addressing unemployment and food insecurity. The school farm is considered a necessity in the teaching and learning of Agriculture for acquisition of practical skills. This study aimed at establishing the relationship between access to the school farm and the level of acquisition of agricultural skills among secondary school students. Correlational research design was adopted. The study targeted 1532 secondary school teachers and 4327 form three students in Malava Sub-County. The accessible population comprised of the 171 teachers of Agriculture and 2532 form three Agriculture students. Based on Nantuma formula, 15 schools were sampled. Based on the Yamane formula, 150 form three students of Agriculture were sampled. One Agriculture teacher was selected from each of the sampled school. Questionnaires and an observation guide were used to gather data. A pilot study was carried out in Kibwezo Sub-County to determine the instruments' reliability where Cronbach's alpha of 0.89 and 0.72 was obtained for the agriculture teachers and students' questionnaire respectively. Reliability of the observation guide was determined qualitatively by discussing the items with the supervisors. Chi-square test of relationship was used to analyze the findings of this study aided by the Statistical Package for Social Sciences (SPSS) version 26. The study established that level of access to the school farm had a significant relationship to the level of agricultural skill acquisition among the students. Based on the findings, the study recommended that to enhance level of access to the school farm especially during lesson time, more time needs to be allocated to Agriculture on the timetable by the Ministry of Education.

Keywords: Level of Access, Agricultural Skills, The School Farm, Secondary Schools.



RELATIONSHIP BETWEEN LEVEL OF ADEQUACY OF THE SCHOOL FARM AND THE ACQUISITION OF AGRICULTURAL SKILLS AMONG SECONDARY SCHOOL STUDENTS

(Research article)

Robert Ouko Recha ^{a *}, Miriam Nthenya Kyule ^b, Lydia Nkatha Kimuthia ^c

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Received: 29.08.2024

Revised version received: 14.10.2024

Accepted: 17.10.2024

Abstract

Teaching and learning of Agriculture at the secondary school level aims at improving the learners' agripreneural skills so as to enable them take an active role in the agricultural value chain in the future. Proper implementation of the Agriculture curriculum in Kenyan secondary schools can thus help in mitigating the rampant youth unemployment and food insecurity. Owing to its vocational nature, the implementation of Agriculture demands the incorporation of an array of resources and facilities; the school farm being considered the most important. It is within this facility where students get the opportunity to engage in practical activities thus reinforcing the theoretical concepts learnt. This study sought to determine the relationship between level of adequacy of the school farm and the acquisition of agricultural skills among secondary school students in Malava Sub-County, Kakamega County, Kenya. Correlational research design was adopted. Using the Yamane formula, 150 form three students of Agriculture were sampled from 15 schools. One Agriculture teacher was selected from each of the sampled school. Questionnaires and an observation guide were used to gather data. Chi-square test of relationship was used to analyse the findings of this study aided by the Statistical Package for Social Sciences (SPSS) version 26. The study established that adequacy of the school farm significantly contributes to acquisition of agricultural skills.

Keywords: Practical agricultural skills; School farm; Agriculture; Secondary schools

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E-mail: rcharenb@gmail.com

DOI: <https://doi.org/10.5281/zenodo.14222628>



RELATIONSHIP BETWEEN SELECTED SCHOOL FARM FACTORS AND THE ACQUISITION OF AGRICULTURAL SKILLS AMONG SECONDARY SCHOOL STUDENTS IN MALAVA SUB-COUNTY, KAKAMEGA COUNTY, KENYA

(Research article)

Robert Ouko Recha ^{a, *}, Miriam Nithenya Kyule ^b, Lydia Nkatha Kinuthia ^c

^a Egerton University, P.O Box 536, Egerton, Nakuru 20115, Kenya

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Received: 18.10.2023

Revised version received: 11.01.2024

Accepted: 15.01.2024

Abstract

One of the objectives of teaching Agriculture at the secondary school level is to equip learners with practical agricultural skills as it is deemed as one of the most effective solution to unemployment and food insecurity. The school farm facility provides an opportunity for the learners to put into practice the theoretical concepts learned in the classroom. This study aimed at establishing the relationship between selected school farm factors and the acquisition of agricultural skills among secondary school students in Malava Sub-County, Kakamega County, Kenya. The school farm factors were; availability, level of, accessibility, adequacy and utilization. Correlational research design was adopted. A sample size of 180 respondents which comprised of 165 form three Agriculture students and 15 teachers of Agriculture from 15 schools participated in this study. Questionnaires and an observation guide were used as the data collection tools. Chi-square test of independence was used to analyze the findings of this study aided by the Statistical Package for Social Sciences (SPSS) version 26. The study established that among the school farm factors, only level of utilization and level of adequacy have a significant relationship to the level of skill acquisition among the students.

Keywords: Practical agricultural skills; School farm factors; Agriculture; Secondary schools

Publication 4

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P-ISSN 0976-4089; E-ISSN 2277-1557
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Website: www.soeagra.com/ijert.html
DOI: 10.15515/ijert.0976.4089.15.4.623



Relationship between Availability Status of the School Farm Facilities and the Level of Acquisition of Agricultural Skills among Secondary School Students in Kenya

Robert Ouko Recha, Miriam Nthenya Kyule, Lydia Nkatha Kinuthia
Egerton University, Kenya
Corresponding author's Email: recharobert@gmail.com
ORCID ID: <https://orcid.org/0009-0007-3652-6804>

ABSTRACT

One of the objectives of teaching Agriculture at the secondary school level is to equip learners with practical agricultural skills as this is considered one of the ultimate panacea to addressing unemployment and food insecurity. The school farm is considered a necessity in the teaching and learning of Agriculture for acquisition of practical skills. This study aimed at establishing the relationship between availability status of the school farm facilities and the acquisition of agricultural skills. Correlational research design was adopted. The study targeted 1532 secondary school teachers and 4327 form three students in Malava Sub-County. The accessible population comprised of the 171 teachers of Agriculture and 2532 form three Agriculture students. Based on Nassiuma formula, 15 schools were sampled. Using the Yamane formula, 150 form three students of Agriculture were sampled. One Agriculture teacher was selected from each of the sampled school. Questionnaires and an observation guide were used to gather data. A pilot study was carried out in Khwisero Sub-County to determine the instruments' reliability where Cronbach's alpha of 0.89 and 0.72 were obtained for the agriculture teachers and students' questionnaires respectively. Reliability of the observation guide was determined qualitatively by discussing the items with expert data analysts from Egerton University. Chi-square test of relationship was used to analyse the findings of this study aided by the Statistical Package for Social Sciences (SPSS) version 26. The study established that availability status of school farm facilities does not significantly contribute to students' level of acquisition of agricultural skills. Based on the findings, the study recommended that the government of Kenya through the Ministry of Education and school managements should not only improve on availability status of the school farm facilities but also find ways of improving on other factors such as level of access, adequacy and utilization of the school farm to ensure practical teaching of Agriculture for skill acquisition.

Keywords: Agriculture Teaching, secondary school level

Received 10.09.2024

Revised 12.10.2024

Accepted 20.11.2024

CITATION OF THIS ARTICLE

Robert O R, Miriam N K, Lydia N K, Relationship between Availability Status of the School Farm Facilities and the Level of Acquisition of Agricultural Skills among Secondary School Students in Kenya. Inter. J. Edu. Res. Technol. 15[4] 2024; 06-23.

INTRODUCTION

Educational facilities according to Edokpolor and Dumbiri (2019) are the tangible assets that can easily be seen and observed in learning institutions where they contribute directly or indirectly to the teaching and learning processes by providing a conducive environment. The school farm is arguably one of the most relevant facilities in agricultural education. Machisu, Opondo, Nakhumicha and Mosi (2022) affirm that school farms provide a laboratory that enhances the quality of secondary school agricultural education. In the developed world, the concept of school agricultural farming began in the early 19th century. Christie (2016) points out that during this period, school farms were established across the United States of America, Australia and Europe with a goal of improving the quality of education through actively involving children in the learning process. Pascoe and Wyatt-Smith (2013) pointed out that in Australian schools, there are many different types of school gardens in practice which include; indigenous gardens, kitchen gardens, garden clubs, and permaculture gardens which cover a wide array of aspects of the school curriculum.

One of the long-lasting objectives that guides agricultural education in Africa is to produce appropriately prepared human resources for public and private employment in agricultural activities (Evelia, 2014;