

**CHALLENGES FACING ASSESSMENT OF SECONDARY SCHOOL
AGRICULTURE PROJECT AND THEIR IMPACT ON THE RELIABILITY AND
VALIDITY OF THE SCORES IN MOMBASA COUNTY.**

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**A research project submitted to the University of Nairobi in partial fulfillment of the
requirements for the award of the degree of Master of Education in Measurement &
Evaluation in the Department of Psychology**

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DECLARATION AND APPROVAL

STUDENT'S DECLARATION

“I declare that the work in this research project is entirely my own work and has never been submitted as an assignment at the University of Nairobi or any other university. Every secondary material used in this project has been duly acknowledged and referenced as required”.

Signature..... Date.....

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Regn. No. E58/63594/2013

SUPERVISOR'S DECLARATION

“I confirm that this research project has been prepared by the student and is being submitted for examination with my approval as University supervisor.”

Signature: _____ Date: _____

Prof. Patrick Obonyo Digolo

Supervisor

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DEDICATION

I dedicate this work to my late father, Mr. Reuben Malembi Kyigamba for his commitment in educating all of us, his children.

ACKNOWLEDGEMENT

I wish to thank the Almighty God for granting me the wisdom, resources and good health which has enabled me to successfully complete my course of study. I bestow special gratitude upon my supervisor, Professor Patrick O. Digolo for humorously guiding me throughout the research process till this far; I will not forget the input of my course coordinator, Dr. Karen Odhiambo, my lecturers and my fellow classmates (Med. M&E, outreach group 4, 2013). You have really made me what I am.

Special thanks go to my family members especially my wife, my children and my mother not only for encouraging me but also for their perseverance when I was not there for them as I pursued my studies. I also dearly acknowledge the support given to me by my principal, deputy principal and staff mates at Changamwe Secondary School by according to me the much needed time to complete my assignments.

I also appreciate the cordial support I got from the staff at County Education Office, Mombasa, T.S.C Units Mombasa and Changamwe and all the principals and agriculture teachers who sacrificed their precious time to listen to me and respond to my instruments.

My friend and mentor, Mr. Wasonga Samuel, you have always been ready to respond to my calls and you went beyond answering me, you also encouraged me, making challenges look easier to overcome; I will always treasure your contribution to my study.

May God shower all of you with His blessings.

ABSTRACT

The study was conducted to determine the challenges facing assessment of K.C.S.E agriculture project and their impact on reliability and validity of student scores in agriculture.

The study employed a descriptive research design of correlation type where the relationship between project scores and final scores was analysed. The study targeted 30 principals, 30 teachers of agriculture and 547 candidates (2014) who sat for agriculture from 30 schools in Mombasa County.

A questionnaire was used to collect data on perception of principals and agriculture teachers towards factors influencing the assessment of K.C.S.E agriculture project as a challenge, while Kenya National Examinations Council (K.C.S.E) printouts and manual mark sheets were used to collect data on candidates' final scores and project scores respectively.

Data collected was compiled into two data files, one for data on perception of principals and agriculture teachers and another on project and final scores.

The data files were subjected to descriptive statistical procedures namely frequencies, measures of central tendencies, particularly the mean, measures of dispersion such as standard deviation; and inferential statistical procedures mainly , t-tests, correlations, regression and analysis of variance using SPSS software in order to make conclusions.

The study revealed that principals rated 91% of the factors as serious while teachers rated 56.53% as serious and 4.35% as very serious.

Although principals reported a higher mean perception score of 2.77 compared to the teachers at 2.69, the study did not reveal a statistically significant difference between principals and agriculture teachers ($t=0.0613$, $df=44$, $p>0.05$). Principals ($M=2.77$, $\sigma = 0.398$) did not report a significantly higher score than agriculture teachers ($M= 2.69$, $\sigma =0.543$).Project scores were found to correlate positively with final score but with only a medium coefficient ($r=0.457$, $p<0.001$).An analysis of variance to determine the predictive power of project scores on the final score yielded a test statistic $F=60.27$, $p<0.001$ and an R^2 value of 0.208 implying project scores predict approximately 21% of the final score.

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ABBREVIATIONS AND ACRONYMS

| | |
|------------------|--|
| KCPE | Kenya Certificate of Primary Education |
| KCSE | Kenya Certificate of Secondary Education |
| KNEC | Kenya National Examinations Council |
| D.E.O | District Education Officer |
| DQASO | District Quality Assurance and Standards Officer |
| 443/3 | Agriculture Paper 3 |
| SBA | School Based Assessment |
| CA | Continuous Assessment |
| KLB | Kenya Literature Bureau |
| H.K.E.A.A | Hong Kong Examinations and Assessment Authority |
| NECO | National Examinations Council |
| MPS | Mean Perception Score |
| TSC | Teachers Service Commission |

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CHAPTER ONE

INTRODUCTION

1.1 Overview

This chapter introduces the research. It begins with a background of the study from which the problem is stated, followed by the purpose and objectives of the study. It goes ahead to state the research questions which will guide the work before giving a justification of the research. The scope and limitation of the study will be followed by a theoretical and conceptual framework before closing the chapter with operational definition of terms.

1.2 Background of the study.

Palomba & Banta (1999) define assessment as ‘the systematic collection, review and use of information about educational programs undertaken for the purpose of improving learning and development’. The process involves gathering and discussing information from multiple and diverse sources in order to develop a deep understanding of what students know, understand and can do with their knowledge.

Spiller (2009) asserts that assessment is the single most important determinant of learning. Through assessment, teachers are able to communicate to their students their values, priorities and expectations (Rowntree, in Spiller, 2009). It is important as it determines how a learner will approach learning: the assessment requirement will determine learning strategies employed by the learner. Assessment tasks should therefore nurture and develop the kind of learning that teachers want. Any task of assessment must meet the principle of validity and reliability.

Caffrey(2009), posits that an assessment framework serves four purposes : instructional, where the results are used to modify or adapt instruction methods and materials to meet students’ needs; predictive in which the results are used to determine whether or not a student will meet a set goal; diagnostic , where assessment is used to determine a students’ academic, cognitive

and behavioral strength and weakness and finally evaluative , to determine the outcome of a particular curriculum or program. Since it is not possible for one assessment to realize all the four objectives outlined above he further suggests a comprehensive assessment which combines both formative and summative assessments. Though the distinction between the two is often not very clear Caffrey (2009) contends that formative assessment generally refers to assessment conducted during the learning process while summative assessment is administered at the end of the learning process.

According to the research and information bulletin number 19 (2005), the history of assessment dates back to 2000BC when examinations meant for entry into the Chinese imperial service were conducted. These examinations were offered to those who wanted to attain political and economic power and were thus a means of political control by the emperor.

Mass examinations came into being in the 19th century and were designed to reward and evaluate the able, separate pupils into different grades, vocations and professions. In 1867, the Royal commission of education in Scotland reviewed its state education which was climaxed by the enactment of the Scottish Education Act in 1872 which paved way for the Scottish Certificate Examination.

Dikli (2003) identifies two approaches to assessment namely traditional assessment which includes multiple choice tests, true/false tests, essays, short answer tests and alternative assessment which may be authentic/performance or constructivist. Performance assessment is where a student is involved in active generation of a response that is observable either directly or indirectly through a permanent product. Authentic assessment is one in which the nature of the task and context in which the assessment occurs is relevant and represents real world problems.

Alternative assessment forms the growth and performance of the student where failure to perform in a particular task at a particular time can be compensated by a demonstration of ability at a different time and in a different situation.

Griffith (2005), and the Nigerian Education Commission (2000) define school based assessment (SBA) as the process where students undertake specified assignments during the course of the school year under the guidance of the teacher with the aim that the assessment results would be included as part of the public assessment. It is also called continuous assessment (CA). The Hong Kong Examinations and Assessment Authority (H.K.E.A.A) defines it as assessments administered in schools and marked by the students' own teachers. SBA scores awarded was count towards students' public assessment results (H.K.E.A.A, 2010). Among other objectives, SBA is intended to certify the validity and reliability of the results of pupils' performance in the final examination, assessment of affective, psychomotor and cognitive domains of the learner, and to develop effective and productive learning habits in the learner (Bello & Tijani). According to Bello the types of assessment that lend themselves to SBA are class tests, class exercises, homework, observations, practical skill testing and projects. Dikli (2003) agrees to this by adding that strategies of authentic performance include experimentation, portfolio, demonstration, exhibits and projects.

A project is any type of method of assessment that displays what students know about a specific topic (Dikli, 2003). It may be administered individually or in groups where learners are expected to use their problem solving skills to respond to a given situation and present their findings in various forms such as role plays, presentations and written reports (Simon et al in Dikli, 2003). Thomas (2000) defines it as a complex task that involves students in problem solving, decision making, giving students an opportunity to work with autonomy over an extended period of time and ends up in a real product or presentation, while the Asian Social Science Journal (ASSJ) defines it as a hands on activity under taken by students in groups or

as individuals with an aim of solving a problem and thus contribute to new knowledge (ASSJ,2014).

Projects allow learners to express their knowledge of the material in their own way using different intelligences (Brualdi, in Dikli, 2003).The use of project approach has been recommended over the years because of its holistic approach. Yip &Cheong (2005) contend to this when they assert that SBA provides a more holistic and valid measurement of student abilities. In a project, the task is tied to the curriculum content and the assessment is designed to evaluate the student's knowledge of the content (Asim 2012).

In Kenya agriculture was introduced in primary and secondary schools to instil values, attitudes, knowledge and practical skills in the learners in order to improve agricultural production in the country (Nyang'au, Kibett &Ngesa 2011). According to Nyang'au et al, this would be achieved by exposing the youth to basic principles and practices of agriculture.

1.3 Statement of the problem

Since the introduction of CA in assessment strategies, a number of challenges which have impacted on reliability and validity of the scores have been observed. The West African Examination Council (WAEC 1990, 1993) discovered that the scores awarded by teachers in SBA were higher than what the students scored in external examinations, a clear implication that teachers were too generous in awarding scores. SBA scores also appeared to be clustered together indicating an effort by the teacher to ensure each candidate was close to the maximum score in the class. This rendered the SBA scores so unreliable that the WAEC reduced the weighting of SBA from 40% to 30% (Bello), besides moderating them before incorporating them into the final grading in an effort to improve their validity and reliability.

In Tanzania Njabili, Abedi, Magesse and Kalole, (2005) found that CA scores were higher than the final examination scores in CSEE. Phillips (2007) observes that that head teachers were so

concerned about pass rates and put a lot of pressure on their staff to ensure best marks are awarded in SBA. He further observes that even clusters of teachers moderating school based scores tended to manipulate the system, making the whole process a mere formality.

Mwanyumba and Mutwiri (2009) discovered that SBA marks from teachers were unreliable, where teachers tended to bend the assessment criteria and at times submitting fake marks, there is lack of uniform facilities making assessment rather subjective than being objective, and teachers were noted to be dishonest. Mwanyumba & Mutwiri note that all the above led to inflated marks which did not correlate with the theory papers of the same subject in the final examination. SBA marks are thus scaled down (moderated) using theory papers.

Despite the above studies which present a grim picture of school based assessment, there are other studies which indicate otherwise. Ongukola (2007) conducted a study to determine the effectiveness of SBA scores as predictors of student final score in integrated science and found that SBA scores in integrated science were effective in predicting their final grades in Junior Secondary Certificate of Education (JSCE).

Andala, Digolo, & Kamande, (2014) conducted a study to determine the reliability of mock examinations in terms of quality assurance indicators to predict the results of the Kenya Certificate of Secondary Education examinations (KCSE). A survey design with questionnaire was used as the research tool, administered to a population sample of 65 secondary schools that represented all the categories and quantitative and qualitative analysis done. The study found that there was high positive correlation (0.949) between the mock and KCSE examinations results. The study concluded that mock examinations were reliable but there was need to harmonize the structures for setting, moderation and invigilation to make it more stringent.

Kolawole & Ala (2013) examined the predictive validity to determine the relationship and effects of Continuous Assessment Scores (CA) on the performance of students who sat for the Senior School Certificate Examination conducted by National Examinations Council (NECO).

The scores which were obtained from NECO had been transformed and trial-tested for psychometric properties. Six research hypotheses were tested at $\alpha = 0.05$ level of significance. Data was analyzed using descriptive statistics of means, standard deviation and inferential statistics of regression analysis. The findings showed that though CA Scores yielded positive influences on the final scores/final grade, the moderated version yielded negative influence and effect, thus lowering the grade. Based on the above findings, we cannot use Continuous Assessment (CA) Scores alone to predict students' performance in mathematics and also that principals should be encouraged to submit the actual CA worth of the students.

Okunya & Kinyua (2014) carried out a study in Nyahururu District in Kenya to establish the factors influencing the validity and reliability of teacher made tests. A mixed descriptive survey research design was applied where the data was collected through questionnaires and interviews with key informants. Analysis was done quantitatively to survey data collected through questionnaire while data from interviews were qualitatively analyzed. The study revealed teacher-made tests to be generally valid and reliable.

Most studies on school based assessment have focused mainly on teacher made tests conducted in a classroom setting, leaving out the other components of SBA, among them the project. Nyang'au, et al (2011) looked at the perceptions of students on factors influencing implementation of the project and the perception of teachers and school principals on factors influencing initiation of the project (Nyang'au, et al, 2011).

All the studies indicated so far have been looking at the factors which impact on the project or school based assessment generally. They did not go beyond to investigate the impact of these factors on the validity and reliability of student scores in the agriculture project. This is the gap which the researcher was seeking to fill in the study.

1.4 Purpose of the study

The project is assessed by the teacher who awards the scores and transmits them to KNEC for moderation and final award of score in Agriculture.

The purpose of the study was to examine the challenges facing teachers in the assessment of KCSE agriculture project component and their impact on the validity and reliability of student scores in the project in Mombasa County.

1.5 Objectives of the study

The objectives of the study were:

- i. To determine how principals and agriculture teachers perceive factors influencing KCSE agriculture project as a challenge in its assessment.
- ii. To compare the perceptions of principals and agriculture teachers towards the challenges facing assessment of KCSE agriculture project.
- iii. To determine the whether project scores are a reliable predictor of final score of student in the subject

1.6 Research Questions

The study sought to answer the following questions:

- (i) Do principals and agriculture teachers perceive factors influencing KCSE agriculture project as a challenge in its assessment?
- (ii) Is there a difference in the perception of principals and agriculture teachers towards the challenges in assessing the project?
- (iii) Are project scores a reliable predictor of students' final score in the subject?

1.7 Research hypothesis

The research intended to validate the following hypotheses:

- i. H_0 : Principals and agriculture teachers do not perceive the factors influencing KCSE agriculture project as a challenge in the assessment of the project.
- ii. H_0 : There is no difference in perception between principals and agriculture teachers towards the factors influencing KCSE agriculture project as a challenge in the assessment of the project.
- iii. H_0 : Project scores awarded by the agriculture teacher are not a reliable predictor of final score of the student in the subject.

1.8 Significance of the study

Studies conducted so far on school based assessment have resulted in conflicting findings. The W.A.E.C (1990, 1993), Njabili et al (2005), Mwanyumba & Mutwiri (2009) and Phillips (2007) found SBA results to be unreliable. Kolawale & Ala (2013) emphasise this when they say Continuous Assessment (CA) scores alone cannot be used to predict students' performance in mathematics, and also urge principals to submit the actual CA worth of the students. This underscores the fact that CA scores are unreliable predictors of student performance in the final examination. In contrast, Ongukola, (2007), Andala et al (2014) and Okunya & Kinyua (2014) found SBA scores to be only fairly reliable. The study would thus seek to establish the reliability of SBA with specific reference to secondary school agriculture project.

The study was also significant in the sense that it cast some light into an area that appears to have been overlooked by the examining body, (KNEC) for a long time: the need for the project to be an avenue for the students to practice what they knew and therefore the need for the scores to be correlated to the student scores in the theory papers.

It highlighted the challenges that teachers and principals faced in the assessment of the project and the recommendations in the study would attempt to address the challenges. Where it was found that the challenges impact negatively on the reliability of the scores intervention measures were recommended to improve reliability.

Besides, the loopholes which dishonest teachers (Phillips, 2007, Mwanyumba & Mutwiri 2009) used to manipulate the system of assessment were be addressed.

The recommendations made in the study will go a long way in improving the project assessment skills of the teachers and thus not only improving the efficiency of the teacher, but also improving the score in the subject and developing the skills that are intended by the project.

1.9 Scope of the study

Mombasa county lies between latitudes 3°56' and 4°10' South and 39°34 and 39°46' East, covering a total area of 294 Km² comprising of 229.9 Km² of land and 65Km² of water mass. It is situated within the coastal lowlands rising from the sea level to about 132m above sea level. Mombasa County Government, First County Integrated Development Plan (CIPD,2013).

The study was conducted in secondary schools offering agriculture in all the four sub counties of Mombasa County. These sub counties are Mvita, Likoni, Kisauni and Changamwe. There are 30 such schools, both private and public. The respondents were teachers and principals of the said schools.

1.10 Limitations of the study

Mugenda & Mugenda (2003) define a limitation as any aspect of the study which may affect the results negatively or may hamper generalizability of the results. The target population is low, comprising of only 30 schools most of which have only one agriculture teacher, while some may have none. This, coupled with respondents who may not cooperate would result in conclusions which may not effectively represent the nationwide scenario, but would serve well for the county. The limited scope of the study was thus a major limitation.

1.11 Assumptions of the study

An assumption is any important fact presumed to be true but not verified (Mugenda & Mugenda, 2003). The underlying assumption in this study was that all 30 schools offering agriculture have land within their compound and they have at least one teacher of agriculture. It also assumed that the school had a record of the raw project scores for the 2014 KCSE agriculture project.

1.12 Theoretical framework

The study was based on Kolb's theory of Experiential Learning and David Ausbel's theory of Meaningful learning both of which are behavioural theories of learning,

1.12.1 Theory of Experiential Learning

According to Kolb's theory of Experiential Learning, learning is a process in which knowledge is created by way of transforming experiences that learners go through. The theory is based on the premise that individuals learn best through experience (Conlan, Grabowski & Smith, 2003). Experience thus plays a central role in the learning process (Sternberg & Hang, 2000), and is thus learner centered.

According to Baker & Robinson (2012), the impetus for experiential learning process is provided by among other activities, group projects. Other activities include school farm work, research projects, and guest speakers. It provides for learners to learn through student centered experiences by doing, discovering, reflecting and applying rather than instructor centered experiences. This helps the students to develop communication skills, self-confidence, and decision making skills by dealing with real world problems (Northern Illinois University, 2011)

Learning by doing in secondary school agriculture has also been emphasized by Longshal and Usman (2009) because of it being a practical based subject. Learning by doing in agriculture

gives students a chance to utilize the principles learnt in class and apply them to real life situations (Cheek et al, 2010)

The theory has further been supported in Benjamin Franklin's maxim of 1750 who said "Tell me and I forget, Teach me and I remember, Involve me and I was learn" (Northern Illinois University, 2011). Since agriculture is a practical oriented subject, practical activities are vital in its teaching and inadequacy of such activities makes learners not to be well acquainted with knowledge and technical skills.

1.12.2 Theory of Meaningful Learning

The study applied the framework of meaningful learning by David Ausbel according to which the learner actively constructs knowledge by using internal cognitive interpretations. The teacher is more of a guide than an instructor and thus only stimulates and supports activities which engage the learners in thinking.

Meaningful learning invokes the spread of activation phenomenon where the recall of a fact activates the memory of another fact which leads to recall of another fact to which it is related. This would not arise if the facts were rote learned. According to David Ausbel, meaningful learning occurs where the learner fully understands the knowledge learned and how the specific knowledge relates to other stored facts.

In meaningful learning the learner must relate new knowledge (concepts and propositions) to what they already know in the view of Ausbel as cited by (Asian e University). This requires knowledge to be constructed by the learner and not transmitted to him, and thus learning becomes meaningful when the learner actually performs the task himself.

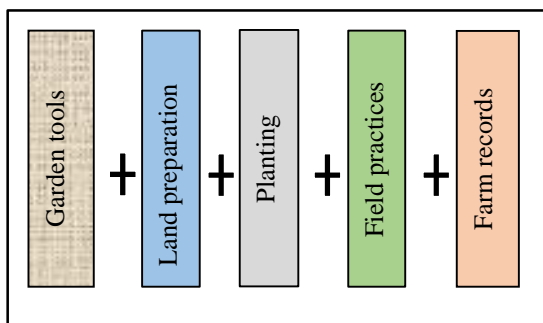
The secondary school curriculum aims to, among others enhance skills needed in carrying out agricultural practices, develop self-reliance, resourcefulness and problem solving abilities and

promote agricultural activities which enhance environmental conservation Kenya Literature Bureau, (KLB,1992).All this is taught in different topics covered in secondary school agriculture syllabus from form 1 to form 4. In order to achieve the above objectives, the learner should be able to relate the knowledge gained in different topics to each other so that it makes a whole. The project gives an opportunity for the learner to package all that knowledge during the nine months of its implementation. This can be explained and illustrated as below:

The students are taught about garden tools, land preparation, planting, field practices and farm records as separate topics in the course cutting across form one through to form four. However, during the implementation of the project, the learner has to recall all this and articulate it for successful execution of the project. This helps the learner to internalize the concepts as in Fig 1 below:

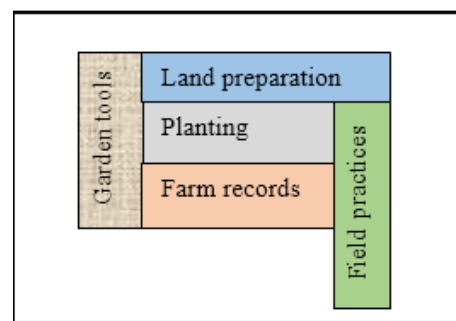
Fig 1. *The difference between Rote learning and Meaningful learning (adapted from Asian e University)*

Rote Learning



=

Meaningful Learning



1.13 Conceptual framework

The conceptual framework shows the interrelationship between the variables in the study graphically or diagrammatically in order to bring out clearly the proposed relationships (Mugenda & Mugenda, 2003)

Secondary school agriculture is tested in three papers 443/1, 443/2 and 443/3. 443/1, and 443/2 are both theory based. 443/3 is based on a project and this forms our independent variable in the context of the study. The council avails project materials including project guidelines and marking scheme. The school provides inputs for the project. The teacher assesses the student continuously based on given assessment criteria. The student finally writes a report. The project is marked out of 100% in which the actual project accounts for 80% while the project report accounts for 20%. The teacher then uploads the total project score to the council.

The intervening variables are the challenges that teachers and principals face in assessing the project and they range from inadequate tools and facilities, high cost of project, lack of teacher training in project assessment etc.

Once the scores are received by the council, they wait for the theory papers to be marked before it moderates the project scores with the scores from the theory papers to get the student's final score.

1.13.1 Moderation

Moderation is a means of adjusting the average and the spread of raw SBA scores of students in a given group with an aim to maintain the comparability across groups, where a moderating variable like public examination scores is used to compare performances of different groups (H.K.E.A.A, 2010). The main reason for carrying out moderation is to ensure the consistency of assessment standards across schools due to the concerns raised by Mwanjumba & Mutwiri (2009), Njabili et al (2005), WAEC (1990, 1993)

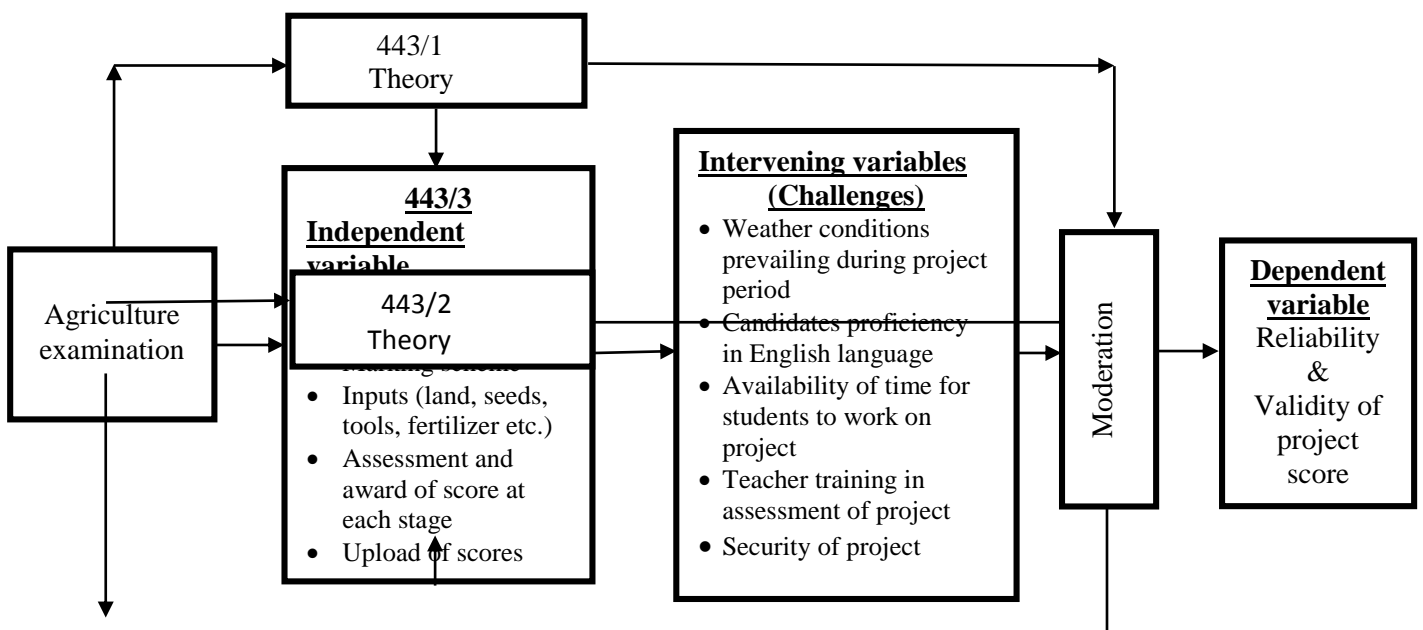
Moderation may be done statistically, using expert judgment or a consensus approach.

Statistical moderation is appropriate where there is another measure available that can be used to ‘moderate’ schools’ raw SBA scores. In the case of secondary school agriculture, this other measure is the score in paper 1 and paper2. Mwanyumba & Mutwiri (2009).

The effect of moderation is that if the project score was overstated or understated, then it was not correlate positively with the student’s final score (KNEC 2013). This would mean that the project score of the student is neither reliable nor valid in predicting the final score.

The conceptual framework for the study is given in the following diagram, fig 2

Fig 2. Conceptual framework for the implications of challenges of assessment of project to reliability and validity of the project score



Source: Researcher, 2015

1.14 Definition of terms

| | |
|----------------------------|---|
| Principal | The Head of a Secondary School |
| Teacher | The teacher who teaches agriculture in the school |
| Agriculture Project | The project component of KCSE agriculture examination |
| Challenges | The conditions which make it difficult for the agriculture project to be conducted according to the guidelines given |
| Assessment | The process in which the teacher examines the work done by the candidate and awards a score based on the marking scheme |
| Reliability | The consistency of the scores |
| Validity | The dependability of the scores |

| | |
|-----------------------|---|
| Project scores | The score which the teacher assigns to a candidate's work based on the marking scheme provided by KNEC |
| Final scores | The results of the candidate awarded and released by KNEC in agriculture |
| Moderation | The process of adjusting project scores to align them with scores in theory papers |
| Instructions | The guidelines provided by KNEC on the conducting the project |
| Materials | The package of information provided to schools by KNEC including instructions to schools, declaration forms, manual mark sheets, marking scheme, report form and return envelop |
| The Council | The Kenya National Examinations Council (KNEC) |

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The review of literature focuses on the examinations offered by the Kenya National Examinations Council, narrowing to agriculture and finally closing in on the project. It also focuses extensively on the constructs of validity and reliability; what they are, the various types of each and what generally influences them.

2.2 Examinations offered by Kenya national Examinations Council

The Kenya national Examinations Council (K.N.E.C) was established in 1980 after the collapse of the East African Community to take up the functions of the defunct East African Examinations Council. The council is mandated to set and maintain examinations standards

and to conduct public academic, technical and other national examinations within Kenya at basic and tertiary levels among others. (KNEC Act No.29)2012. It also offers examinations to South Sudan.

In discharge of its mandate, the council offers 11 examinations in four main categories namely school examinations, post school examinations, technical and business examinations and foreign examinations (<http://www.knec.ac.ke/examinations>)

School examinations are offered to candidates at primary school level Kenya Certificate of Primary Education (KCPE) and secondary school level Kenya Certificate of Secondary Education (KCSE). KCSE is offered to candidates who have successfully completed the 4 years of secondary schooling. There are a total of 31 examinable subjects (www.knec.ac.ke), examined in a total of 72 papers (<http://www.knec.ac.ke/examinations>). The subjects are clustered into 5 groups. A candidate may register for a minimum of 7 subjects and a maximum of 9.

All subjects in group 1-3 and are theory based, while all subjects in group 4 and 5, except Business Studies (565) are also assessed via a project, aural or oral component, besides the theory. In this category, falls agriculture (443) whose paper 3 (443/3) is project based. Other subjects also assessed via project are home science, art and design, woodwork, electricity, Kenya sign language, drawing and design, among others.

2.2.1 The KCSE Agriculture Examination

School agriculture is an attempt to instil values, attitudes, knowledge and practical skills in learners in order to improve agricultural production by exposing the youth who formed more than 55% of the population to the basic principles and practices of agriculture (Nyang'au, et al 2011). This followed the recommendations of the Mackay Commission Report of 1985.

The agriculture paper tests the candidate's competence in understanding agriculture principles, concepts and practices where a wide range of knowledge and skills are tested. The subject is tested in 3 papers where Paper 1 is a theory paper marked out of 90 comprising of General agriculture, crop production, agricultural economics, and soil and water conservation.

Paper 2 is also a theory based paper, comprising of livestock production, farm power and farm machinery, farm structures, farm tools and equipment, and is also marked out of 90. (KNEC 2014). Paper 3 is the project component where candidates are given an opportunity to demonstrate mastery of knowledge and skills acquired during the four years of learning the subject. It tests the candidate's practical skills in growing a selected crop, from land preparation to harvesting, rearing selected livestock to maturity or construction of farm structures. The project is assessed in two parts: the actual project activity, which accounts for 80% of the score and the project report which accounts for 20 %, adding up to 100% (KNEC 2013).

2.2.2 The KCSE Agriculture Project

Agriculture project is a school based assessment activity undertaken by secondary school students who study agriculture at form four as required by the curriculum. The project component was introduced in KCSE examination in 1989 to enhance a linkage between theoretical knowledge learnt in class and real life agriculture experience (Nyang'au et al, 2011). The project tests the knowledge, attitudes and psychomotor skills of the learners in a given enterprise. (Nyang'au et al, 2011)

Practical activities are vital in the teaching of agriculture education and inadequacy of such activities makes learners to be poorly acquainted with knowledge and technical skills, because agriculture is a practical oriented subject and is best learnt by practicing (Njoroge, Mwangi & Udoto, 2014) Being a school based assessment activity, the project is assessed locally by the school agriculture teacher.

The KCSE agriculture project runs from January to September every year and is assessed by the teacher (KCSE timetable 2013). The KNEC avails materials to schools via D.E.Os offices. These materials include detailed guidelines to the institutions for projects in order to provide a common minimum standard for all candidates such as instructions, manual mark sheet, assessment sheet and the marking scheme among others. The instructions outline the project options available where a school (represented by the agriculture teacher and principal) chooses one. The school is expected to provide the inputs for the project.

The students are supposed to carry out the project independently and the role of the teacher is to objectively assess and evaluate each candidate's work at all stages of implementation. "The assessment by the teacher should be on the basis of the class such that there is an even distribution of scores from lowest, average and finally highest performers". Inflating project scores disadvantages candidates when standardization is done (KNEC 2013).

The teacher upon receipt of the materials selects the project from the options given and organizes the candidates and guides them in conducting the project. The teacher is expected to assess the project at various stages using the marking scheme provided. The confidential assessment form provides for the principal and the teacher to declare that the assessment is a true one: there is no room for witness, such that one can fill it without actually assessing.

At the end of the project the candidate writes a report and makes a declaration that they did the project without any assistance. The teacher then uploads project scores to the council website. The scores received from such assessment are correlated with theory papers in order to normalize the marks after which they are scaled down to contribute a portion (20%) to the final grade.

2.3 Reliability

This is a broad term referring to different forms of score stability (Andala et al 2014). The reliability of an assessment tool is an indicator of the stability of that tool in giving the same test scores over time-(test re-test reliability), stability of item scores in the test (internal consistency), or the stability of item ratings by different raters (inter-rater reliability). According to de Villiers (1991), as cited in (Andala et al 2014), reliability is the degree to which a measurement would yield the same results after repeated trials, and a test may be very reliable, fairly reliable or unreliable.

The agriculture project is aimed at testing the ability of the learners to apply the knowledge acquired in the theories. It is expected that a candidate who mastered the theory content was better placed to apply it than otherwise. The council insists that “the assessment by the teacher should be on the basis of the class such that there is an even distribution of scores from lowest, average and finally highest performers”. Inflating project scores disadvantages candidates when standardization is done. (KNEC, 2013) It would thus be expected that those candidates who scored highly in the project would also post good results overall, and they would not be affected much by moderation.

2.4 Validity

A test is valid if it measures what it purports to measure (Hathcoat, 2013). Messik, 1989 and Kane 1992 as cited in (Hathcoat 2013) hold validity as a property of interpretation of test scores and is thus basing it on the scores from tests, while it may also be perceived as a property of the test itself too (Borsboon in Hathcoat 2013).

These two perspectives of validity are important because they influence the kind of evidence one has to look for when validating a test or otherwise (Kinyua&Okunya, 2014). According to (Hathcoat 2013), both instrument based and interpretation based approaches to the construct of

validity are applicable in assessment , but the interpretation based approach lends itself to a wider scope of applications since it can be used in just about all aspects of testing while the instrument based approach applies in contexts where some specific attributes are being measured.

Applying this contention to the assessment of the KCSE agriculture project, we note that the project intends to test knowledge, attitudes and psychomotor skills of the learners in a given enterprise by creating a link between theoretical knowledge and real life agricultural experience (Nyang'au et.al 2011). Kibett 2002 further asserts that the use of project approach as a method of instruction has been recommended over the years because of it being holistic thereby imparting core skills in the learners for self-reliance. This reaffirms the broad scope of the KCSE project and hence the use of the interpretation of test scores approach was applied.

Notar et al(2004) as cited in Kinyua & Okunya (2014) assert that one way of measuring accountability in education is by the extent to which students' performance in SBA can predict their potential performance in the standardized tests such as national examinations. The types of assessment that lend themselves to SBA are class tests, class exercises, homework, observations, practical skill testing and projects.

Going by the above argument, it follows that one way of measuring accountability in education is by the extent to which project scores in agriculture project can predict the potential performance of the candidates in the subject.

2.4.1 Types of validity evidence:

Face validity-an assessment tool would have face validity if by a mere look at the items they appear to measure what it purports to measure (Kinyua & Okunya, 2014). Though it cannot be established scientifically, the agriculture teacher would be in a good position to determine it having taught the students for four years.

Content validity- where the test items match the instructional objectives. It is established by examining the items/tasks if they correspond to the syllabus being tested. It is not determined scientifically hence does not yield any coefficient.(Kinyua & Okunya,2014)

Criterion validity-this is where the validity is determined by comparing the assessment with an external criteria and there are two types :(i)concurrent: established by administering the test we want to validate along with a well-known and widely accepted test. Our test would have concurrent validity if its results correlate with those of the widely acceptable test. This validity lends itself to statistical measurement and yields the concurrent validity coefficient. (ii)Predictive validity-a measure of how well a test can predict some future behavior of the test taker. It is determined by administering the test to a group of subjects then measuring them on what the test is supposed to predict after some time (Kinyua &Okunya, 2014).In this case, the test is the project and what it is supposed to predict is the KCSE score in the subject. The results are correlated to give the predictive validity coefficient.

Construct validity-where the relationship of the test to other information corresponds to a given theory. It is determined by getting information which enables one to know the results of the test responded to what is expected based on knowledge of what is being measured-no scientific measure (Kinyua & Okunya,2014).

2.5 Factors that can affect reliability and validity of Agriculture project

Kinyua & Okunya (2004) posit that the validity and reliability of a test can be simultaneously affected by three variables namely the test taker, the testing environment and the test itself.

Ndirangu (2000) notes that projects can be influenced by factors such as concentrating the energies and attention of learners over a long duration of time on a single activity, some learners may not be exposed or are inadequately prepared for them because they lack prior exposure,

high cost of supervising some projects while some may require expensive materials and equipment. All these revolve around the three variables described by Kinyua & Okunya.

2.5.1 Test taker characteristics in secondary agriculture project

According to Cassel (2003) the characteristics of the test taker can affect the validity and reliability of test scores. In the context of secondary agriculture project, interest of the candidate in the project, the gender of the candidate, absence or presence of the candidate in school, involvement in co-curriculum activities and availability of time for the candidate may influence the test taker hence the reliability and validity of project scores. Interest of the learner enables them to direct their energies towards the project during its implementation. It is important for this interest to be sustained throughout the period. This fact was also emphasised by Kibett (2002) that students have to be interested in any activity they are carrying out. The availability of candidates in school is necessary for implementation of the project. The purpose of the project is to test if the learner is able to link theoretical knowledge learnt to real life agriculture experience (Nyang'au et al, 2011) hence the learner has to be physically present for the results of the project to be reliable and valid. Availability of the candidate will also offer them ample time to tend for the project.

2.5.2 Testing environment in secondary agriculture project

Griswold, 1990 states that if the testing environment is distracting or noisy, the test taker will not be consistent through the testing process. The testing environment in the context of agriculture project would involve school financial resources, security of the project, availability of land and inputs while cost of the project may also have an influence on the reliability of project scores. According to Nyang'au et al, when financial resources are scarce, sustainability of projects would be costly to the schools. This will in turn affect the supply of inputs, tools and equipment and also security of the project. Availability of land or otherwise will also have its impact because where land is not available within the compound the school may have to

acquire land outside the school compound, increasing the threat of security. These factors were perceived by teachers and principals as very important in influencing the implementation of secondary school agriculture.

Testing environment will also involve the supervisor of the project. Principals and agriculture teachers perceived motivation of the agriculture teacher as important and very important respectively in influencing project initiation (Nyang'au et al, 2011). This is probably because the project extends for a period of nine months during which the interest of the agriculture teacher has to be sustained. The agriculture teachers are likely to direct more energy on the project and guide and supervise the learners more effectively if they are motivated and this may help in enhancing reliability of the scores.

2.5.3 The test characteristics in secondary agriculture project

In exercise of the project the KNEC provides the options for schools from which a school will select one based on how sustainable it is. It is worth to note that not all candidates will be interested in the same project as identified by the school (Ndirangu,2000). But as Kibet puts it, the learners have to be interested in the activity they are carrying out. If candidates are engaged in a project that they are not interested in, they may not direct their effort in it. Likewise, the project options provided by the council may be suitable in some ecological conditions but may be quite unsuitable in others.

The project guidelines provided by the council are supposed to be applied uniformly but the extent to which this uniformity exists can only be ascertained when there is an independent external assessor of the project.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This section outlines the method that was used to conduct the study. It begins by stating the design used to conduct the research, then identifies the population involved, the procedure which was used to obtain the sample and the sample size. It also outlines the instruments which were used to collect data, how the validity and reliability of such instruments was determined, how data was collected and analysed and ends with the ethical considerations that were adhered to in the study.

3.2 Research design

The study adopted a descriptive research method of correlation type where the researcher analysed the relationship between raw scores from agriculture project collected from the manual mark sheet and the final score of the students extracted from KNEC KCSE printout.

Correlation is used not only to establish the relationship between variables (Darko & Ansa-Asare, 2009) but also the strength of the relationship (Olaewaju, 2007).

Field, (2009) describes correlational design as one where an observation is made of what naturally goes on in the world without directly interfering with it. This is also called (cross-sectional research), where an independent variable is used to explain a dependent variable. In this case, the independent variable is the project score while the dependent variable is the final score of the student in the subject. According to Field, this provides a very natural view of the question we are researching because we are not influencing what happens.(Nyang'au et al 2011) describe it as an ex-post facto research design, one where a researcher examines the effects of a naturally occurring treatment after it had taken place where there has been no manipulation by the researcher. The KCSE project has been in implementation since 1989 and the challenges facing the implementation of KCSE project (independent variable) were studied after they had already impacted on the validity and reliability of the scores(dependent variable). Without manipulation the researcher determined the impact on reliability and validity of scores caused by the challenges.

3.3 Population

Mugenda & Mugenda (2003) define population as the whole group of objects under study who share a common characteristic. A population can be very general, such as all human beings or very narrow Field,(2009) In this study the population comprised all the 30 teachers who assessed agriculture project in 2014 in Mombasa county, 30 principals of schools offering agriculture in Mombasa county and 547 candidates who sat agriculture KCSE in 2014.

3.4 Sampling and sample size

The study targeted a population of, 30 principals, 30 teachers of agriculture and 547 candidates who sat KCSE agriculture in 2014 in 30 schools in Mombasa County.

The sample size was determined using Sloven’s formula of determining the sample (n) for a finite population. The formula is given as: $n = N \div (1 + Ne^2)$, where; N= population, n =sample size, and e =degree of confidence level. A 95% degree of confidence level was used.

Both non probability and probability sampling were used in the study. Non probability sampling by way of purposive sampling was applied to identify schools offering agriculture for inclusion in the study. Once the schools offering agriculture were identified, they were stratified according their districts. Stratified sampling was used to identify how many students from each district were included in the sample.

After determining the number of students from each district, simple random sampling was used to identify individual students for inclusion. The students were assigned numbers which were then picked randomly to determine who would be included in the study.

Table 1: Population and the sample size

| DISTRICT | CANDIDATES (N ₁) | SAMPLE (n ₁) | TECHNIQUE USED |
|-------------------|------------------------------|--------------------------|----------------|
| Changamwe | 209 | 88 | random |
| Mvita | 167 | 71 | random |
| Likoni | 87 | 37 | random |
| Kisauni | 84 | 35 | random |
| TOTAL (N) | 547 | 231 | Sloven formula |
| TEACHERS | 30 | 30 | Sloven formula |
| PRINCIPALS | 30 | 30 | Sloven formula |

Source: Researcher, 2015

3.5 Instruments

The researcher, after reviewing related literature developed a research instrument to identify the challenges facing the assessment of secondary school agriculture in Mombasa County. Questionnaires designed by the researcher were used as a tool for collecting data. Selection of this tool has been guided by the nature of data to be collected, the time available as well as by the study objectives. Questionnaires have been extensively used in research to collect data on opinions, current conditions and attitudes in a fast and precise way (Orodho, 2008 as cited in Njoroge, Mwangi, & Udoto, 2014) and this justified the use of questionnaire by the researcher. The questionnaire had four parts. Part A was about interviewee's personal information. Part B was about school information while, Part C was about professional information of the respondent. Part D was designed to collect information about the respondents' perceptions of challenges facing assessment of secondary school agriculture.

The challenges were adopted from two studies conducted by Nyangau et al (2011) on the perception of principals and teachers, & perception of students toward implementation of secondary school agriculture project. The perceptions were rated in a five point Likert scale where 1=not serious; 2=least serious; 3=serious; 4=very serious; 5=extremely serious and the respondents were asked to tick in the box that best described their perception of each as challenge.

According to Oso & Onen(2008) document analysis is a critical examination of public or private information recorded and which is related to the issue at hand so that the researcher can obtain unobtrusive information. Since the study was concerned with KCSE agriculture project scores and final score in the subject, the researcher analysed the raw project scores awarded by the teacher and the students' final score in the subject in KCSE results in order to increase the reliability of the data. The documents used for analysis in this study were thus the copy of manual mark sheet and KCSE results printout for 2014.

3.6. Pilot Study

A pilot study was conducted before the main study whose findings were used to make appropriate adjustments by removing inconveniences and ambiguities from the data collection instrument. One school from each sub-county of the county was studied. The teachers involved in the pilot study are not the ones who had supervised the project in 2014 hence did not again participate in the main study.

3.6.1 Validity

Validity is the extent to which research instruments measure what they are intended to measure (Oso & Onen, 2009) and a valid instrument is one whose content is relevant to the purpose of the study. According to Mugenda and Mugenda (1999) validity refers to the accuracy and meaningfulness of inference, which are based in the research results attained from the analysis of the phenomena under the study. To establish validity, before pilot study, the instrument was given to three different teachers independently who had supervised the project for more than 10 years one of whom was examiner in the subject to review and determine if in deed they addressed the pertinent issues in the subject of study, and rate the instrument on the scale of very relevant (4), quite relevant (3), somewhat relevant (2) and not relevant (1). Two of the teachers rated it as very relevant while the third rated it as quite relevant, thus passing the test of validity.

3.6.2 Reliability

Reliability is a measure of the degree to which a research instrument yields consistent results or data after repeated trials (Mugenda & Mugenda, 2003). Kinyua & Okunya,(2014) describe reliability as a measure of how consistent the scores of an individual are from one administration of an instrument to another. If there is consistency in the scores, then the

instrument can be said to be stable, dependable and trustworthy in measuring the same thing each time (Worthen et al, 1993).

Kubiszyn & Borich describe it as the consistency with which a test yields the same rank for an individual taking the test more than one time. Kubiszyn & Borich identify three ways to estimate the reliability of an instrument. Test- retest is a method in which the instrument is administered twice to the same subjects after a lapse of time and the results compared. If the results correlate or compare well, then the instrument is valid. Equivalent forms reliability is determined when the test is administered in two forms which to the same subjects and the scores from the two equivalent forms of the test compared. A high correlation index will imply a reliable instrument. The third method is used to determine the internal consistency by way of splitting the data in two and computing the correlation coefficient for each split, yielding the Cronbach's alpha, α , which is the most common measure of scale reliability (Field, 2009)

The reliability of the instrument was determined by Cronbach's alpha which is most commonly used when there are multiple Likert questions in a survey instrument that form a scale, and there is need to determine if the scale is reliable. Cronbach's alpha (α) gives the lowest estimate of reliability that can be expected for an instrument (Lehman *et al.*, 2005). The items in the instrument were subdivided into four subscales, administrative factors, candidate factors, teacher factors and KNEC factors. While the administrative factors subscale yielded a relatively low reliability of .47, the candidate factors, teacher factors and KNEC factors subscales yielded .87, .93 and .79 respectively. The items in this sub scale were reviewed to improve on reliability and instrument was accepted as overall it had a reliability coefficient of .92, higher than 0.70 or 70% which is acceptable in research (Kathuri & Palls, in Aden A, Yahye, Z & Dahir A, 2013)

3.7 Data collection

The questionnaires were hand delivered to the participating schools by the researcher. The researcher first introduced himself to the principal and then explained the purpose of the study. He then submitted copies of letter of authority before going through the questionnaire items with the principal to clarify any issue with the items. He then requested to meet the agriculture teacher to discuss the same with him/her. Both the principal and agriculture teacher were given sufficient time to complete the questionnaire after which the researcher picked the completed questionnaires.

The researcher also requested for manual mark sheet for agriculture project scores for 2014 and the 2014 KCSE results as secondary sources of data, besides interviewing some of the teachers and principals.

3.8 Data analysis

The data collected was compiled into two data files, one for data on project scores and final scores, and the other on perception of teachers and principals on the challenges facing assessment of the project.

It was then edited and coded to facilitate data analysis (Mugenda and Mugenda, 2003). Data cleaning, entry and analysis was conducted using version 22 of the Statistical Package for the Social Sciences-SPSS which is best recommended for social based studies such as the current one. Data was analyzed using descriptive statistics. Descriptive statistics include frequencies of occurrence, mean, mode, standard deviations, standard errors and skewness. The descriptive technique was chosen because it enabled the researcher to meaningfully describe the scores or measurement using a few indices or statistics. The mean of the two assessments i.e. project and final examination was computed so as to compare the score around which majority of the

students' performance clustered in the assessments while the standard deviation was computed to establish in which assessment the student performance was more homogeneous.

Correlation analysis was used to determine the strength of relationship between project scores and final scores, while regression analysis was used to determine the degree to which project score was predictive of the final score. The analysed data was presented by use of frequencies, proportions and percentage and tables. The 95 percent significance levels were used to test for significant associations and differences between sample groups. This enabled comparisons of the responses to be made and draw conclusions from which the recommendations were made.

3.9 Ethical considerations

In view of the respondents' privacy and respect, the information the respondents gave in this study was treated with utmost confidentiality and was not disclosed to anybody.

The ethical concerns that were adhered to before embarking on research included obtaining a letter of introduction from the University which was used to apply for an authority to conduct research from the National Commission for Science, Technology and Innovation. Authority was also sought from Ministry of Education at the county level which required a letter of introduction from the researcher's immediate supervisor, the school principal. A formal request to administer research instruments and to obtain data by the researcher was made in writing. The identity of respondents from whom information was be obtained in the course of the study, including the 2014 candidates whose results and project scores were used was kept strictly confidential. The nature and purpose of the research was explained to the respondents by the researcher so as to allay any fears of ulterior motives other than academic research. The participants were assured of anonymity; and their freedom to choose to take part in the study at will also emphasized. The questionnaires were kept under the safeguard of the researcher alone. The responses therein were not shared by the researcher to anyone apart from the

researcher's supervisors and only in a bid to get their guidance. The data and documents after analysis and final presentation were properly disposed, destroyed, or deleted; the researcher also assigned security codes to computerized records. All these were done to maintain the ethics required.

CHAPTER FOUR

RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

In this chapter the result of data analysis and its interpretation is presented in different sections. The purpose of this chapter is to answer the three research questions posed in Chapter one based on the analysis of the research findings.

The data collected was compiled into two data files, one for data on student scores in the project and final main/final examination, and the other on perception of teachers and principals on the challenges facing assessment of the project.

The data files were subjected various statistical procedures such as measures of central tendencies particularly the mean and measures of dispersion such as standard deviation in order to obtain inferential conclusions.

The mean of the two assessments i.e. project and final examination was computed so as to compare the score around which majority of the students' performance clustered in the assessments.

The standard deviation was computed to establish in which assessment the student performance was more homogeneous

The data was summarized into frequency distributions which were then converted to percentage. This analysis was used to compute the mean, standard deviation and generate a histogram from which conclusions were made.

4.2 Response Rate

A total of 60 questionnaires were presented to the respondents, 30 for the principals and 30, agriculture teachers. All the 30 agriculture teachers successfully completed the questionnaires which were collected personally by the researcher. Out of the 30 principals, 29 completed the questionnaires, only one did not, because he was the agriculture teacher in the school and opted to respond in that capacity. This gave the study 100% response rate for the agriculture teacher and 96.67% principals. This was way above 70% response rate described as very good by Mugenda & Mugenda (2003). The study made use of frequencies (absolute and relative) on single response questions. On multiple response questions, the study used Likert scale which was considered as ordinal measurement scale in this study in collecting and analyzing the data. The 5 points were used in computing the means and standard deviations. These were then presented in tables and figures with explanations of the output findings being given in prose.

4.3 Distribution of schools

There are four districts in Mombasa County and the schools offering agriculture were classified into two types, public and private. Public schools are schools which are managed by the government while private schools are the ones which are managed by private individuals or organisations including faith based organisations like churches. The research revealed that the 30 schools offering agriculture in the county were distributed as in table 2 below:

Table 2 *Distribution of schools offering KCSE Agriculture in Mombasa County (2014)*

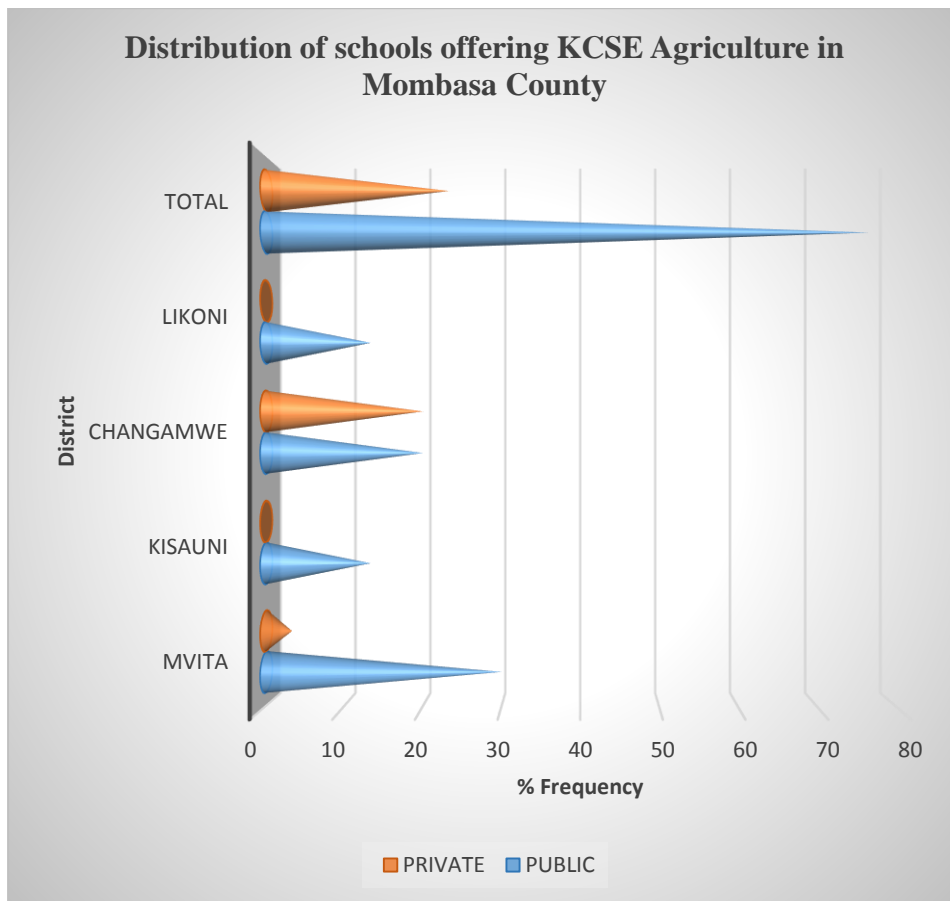
| DISTRICT | PUBLIC | % | PRIVATE | % | TOTAL | % |
|-----------|-----------|--------------|----------|--------------|-----------|---------------|
| MVITA | 9 | 30.00 | 1 | 3.33 | 10 | 33.33 |
| KISAUNI | 4 | 13.33 | 0 | 0.00 | 4 | 13.33 |
| CHANGAMWE | 6 | 20.00 | 6 | 20.00 | 12 | 40.00 |
| LIKONI | 4 | 13.33 | 0 | 0.00 | 4 | 13.33 |
| TOTAL | 23 | 76.67 | 7 | 23.33 | 30 | 100.00 |

Source: TSC Mombasa County (2015)

From the table above, it can be noted that out of the 30 schools offering agriculture, 23 schools (76.67%) are public schools and only 7 schools, constituting 23.3 % are private. Of the seven private schools, six (6) are found in Changamwe district alone while Kisauni and Likoni do not have any private school offering agriculture. The statistics show a proliferation of private schools in Changamwe District. Public schools are constantly inspected by quality assurance officers to ensure they comply with government regulations hence the huge proportion of public schools indicates that the subject is taught in schools that have the necessary infrastructure to teach it.

This distribution is presented further in figure 3 below.

Fig. 3 Distribution of schools offering KCSE Agriculture in Mombasa County (2014)



Source, Researcher, (2015)

4.4 Demographic information

This section describes the respondents' characteristics and the school characteristics. This information was significant so as to enable the study make conclusions which are from credible sources and help understand the background of the schools and respondents as units of analysis. The characteristics of interest captured were respondents' designation (principal or agriculture teacher), gender, highest level of education, and employer for respondents; and the type of

school(private or public),category mixed, girls only, boys only, day, boarding or day and boarding.

Agriculture teachers were also required to state how long they had prepared candidates for KCSE (hence supervised the project), whether or not they were examiners in the subject and finally if they had attended any workshop on assessment of the project and who the organisers were.

4.4.1 Designation of respondents by gender

The respondents in this study comprised of principals and agriculture teachers. Table 3 shows a cross tabulation of the percentage distribution of the respondents who took part in the study by designation and gender.

The table shows that out of the 59 respondents, 32 (54.2%) were male while 27 (45.8) were female. The findings further indicated that 15 principals out of the 29 (51.7%) were male while 14 (48.3%) were female; and that 17 out of the 30 agriculture teachers (56.7% were male while 13 (43.3%) were female. In all categories, the number of males has outweighed that of females which is contrary to popular belief that Mombasa, being a major town is dominated by female teachers.

However, this observation may not necessarily prove this belief wrong bearing in mind that the study was based only on agriculture teachers so that including the teachers of other subjects may change the statistics which at the moment appear to be fairly balanced.

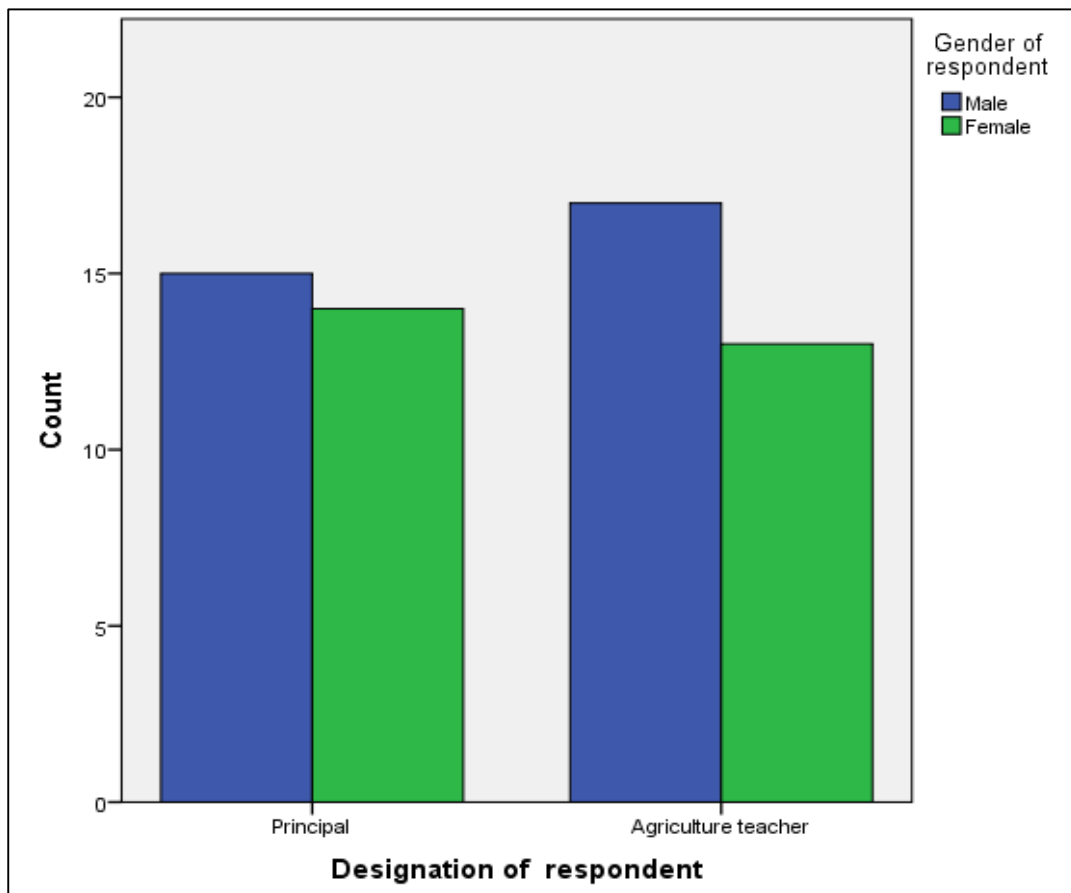
Table 3 Respondents designation by gender

| Gender of respondent * Designation of respondent Cross tabulation | | | | | |
|---|--------|------------------------------------|---------------------------|---------------------|--------|
| | | | Designation of respondent | | Total |
| | | | Principal | Agriculture teacher | |
| Gender of respondent | Male | Count | 15 | 17 | 32 |
| | | % within Designation of respondent | 51.7% | 56.7% | 54.2% |
| | | % of Total | 25.4% | 28.8% | 54.2% |
| | Female | Count | 14 | 13 | 27 |
| | | % within Designation of respondent | 48.3% | 43.3% | 45.8% |
| | | % of Total | 23.7% | 22.0% | 45.8% |
| Total | | Count | 29 | 30 | 59 |
| | | % within Designation of respondent | 100.0% | 100.0% | 100.0% |
| | | % of Total | 49.2% | 50.8% | 100.0% |

Source: Researcher (2015)

The distribution is well depicted in fig 4

Fig 4. Respondents' designation by gender



Source: Researcher (2015)

4.4.2 Highest level of education

The study indicated that all 29 principals had attained a degree level of education with 7 of them (24%) having advanced to masters level. Out of the 30 agriculture teachers, 21 (70%) had attained degree level, while 5 (16.7%) had diploma level of education. It also showed that only 4 agriculture teachers had proceeded to master's level.

This implied that the teachers were trained and had the required skills and knowledge to teach the subject.

The highest education level of respondent by designation is presented in table 4 below and further in figure 5.

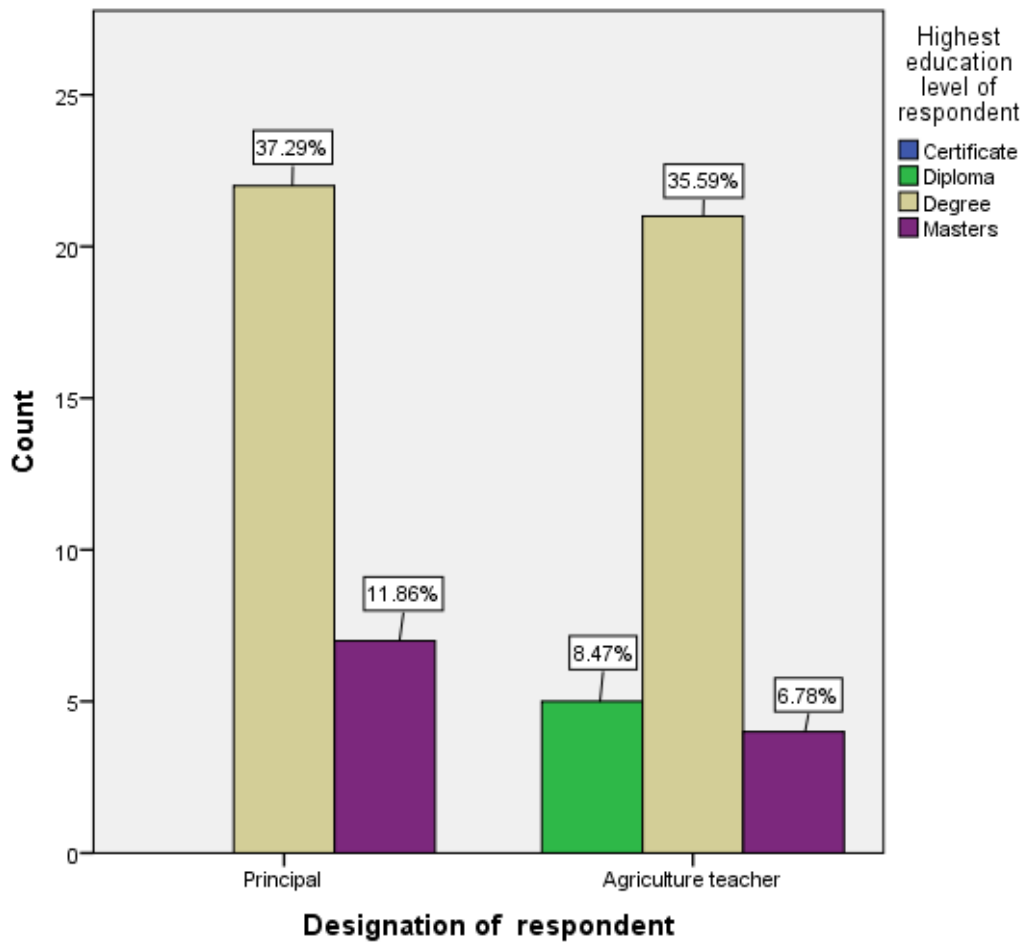
Table 4 *Highest education level of respondent*

| Highest education level of respondent * Designation of respondent Cross tabulation | | | | | |
|---|---------|------------------------------------|---------------------------|---------------------|--------|
| | | | Designation of respondent | | Total |
| | | | Principal | Agriculture teacher | |
| Highest education level of respondent | Diploma | Count | 0 | 5 | 5 |
| | | % within Designation of respondent | 0.0% | 16.7% | 8.5% |
| | | % of Total | 0.0% | 8.5% | 8.5% |
| | Degree | Count | 22 | 21 | 43 |
| | | % within Designation of respondent | 75.9% | 70.0% | 72.9% |
| | | % of Total | 37.3% | 35.6% | 72.9% |
| | Masters | Count | 7 | 4 | 11 |
| | | % within Designation of respondent | 24.1% | 13.3% | 18.6% |
| | | % of Total | 11.9% | 6.8% | 18.6% |
| Total | | Count | 29 | 30 | 59 |
| | | % within Designation of respondent | 100.0% | 100.0% | 100.0% |

| | | | | |
|--|------------|-------|-------|--------|
| | % of Total | 49.2% | 50.8% | 100.0% |
|--|------------|-------|-------|--------|

Source: Researcher (2015)

Fig 5. Highest education level of respondent



Source: Researcher (2015)

4.4.3 Respondents' employer

Teachers and principals are employed by the Teachers service commission, school boards of management or private school owners. The TSC employs teachers who are trained and qualified to teach the subjects they are employed to teach.

Table 5 and figure 6 below shows that out of the 29 principals, 23 of them (79.3%) are employed by the TSC and all these are in public schools. It also shows that 21 agriculture teachers (70.0% are employed by the TSC.

This implies that the principals are qualified to run the schools and likewise the teachers are qualified to teach the subject.

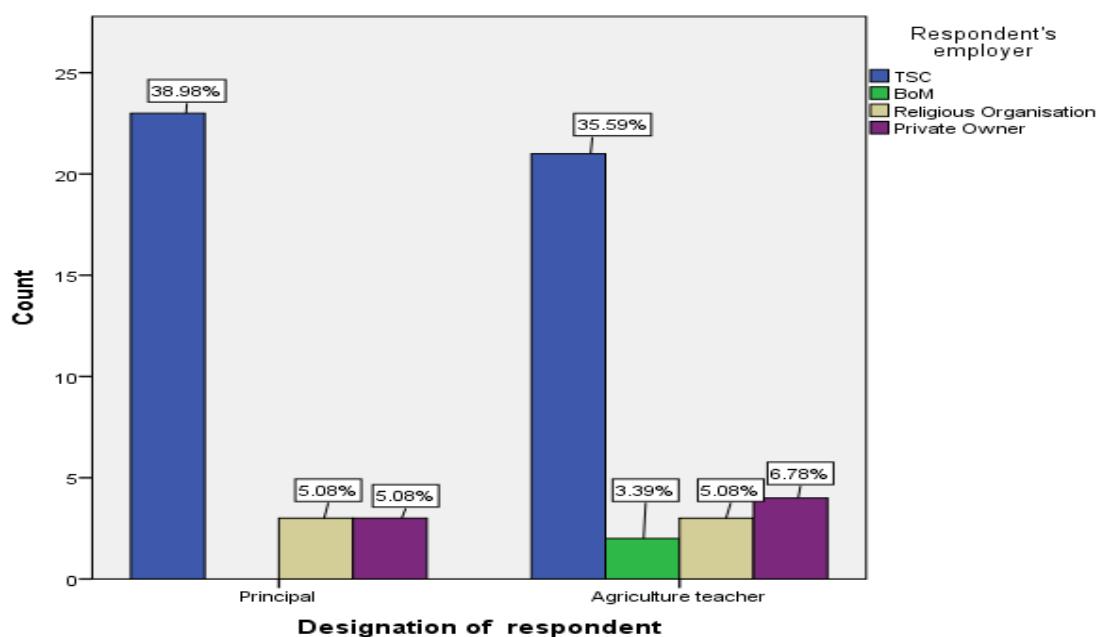
Table 5 Respondents' employer

| Respondent's employer * Designation of respondent Crosstabulation | | | | | |
|--|------------------------|------------------------------------|---------------------------|---------------------|-------|
| | | | Designation of respondent | | Total |
| | | | Principal | Agriculture teacher | |
| Respondent's employer | TSC | Count | 23 | 21 | 44 |
| | | % within Designation of respondent | 79.3% | 70.0% | 74.6% |
| | | % of Total | 39.0% | 35.6% | 74.6% |
| | BoM | Count | 0 | 2 | 2 |
| | | % within Designation of respondent | 0.0% | 6.7% | 3.4% |
| | | % of Total | 0.0% | 3.4% | 3.4% |
| | Religious Organisation | Count | 3 | 3 | 6 |
| | | % within Designation of respondent | 10.3% | 10.0% | 10.2% |
| | | % of Total | 5.1% | 5.1% | 10.2% |

| | | | | |
|------------------|------------------------------------|--------|--------|--------|
| Private Owner | Count | 3 | 4 | 7 |
| | % within Designation of respondent | 10.3% | 13.3% | 11.9% |
| | % of Total | 5.1% | 6.8% | 11.9% |
| Total | Count | 29 | 30 | 59 |
| | % within Designation of respondent | 100.0% | 100.0% | 100.0% |
| | % of Total | 49.2% | 50.8% | 100.0% |

Source: Researcher (2015)

Fig. 6 Respondents' employer



Source: Researcher (2015)

4.4.4 Times one has prepared candidates

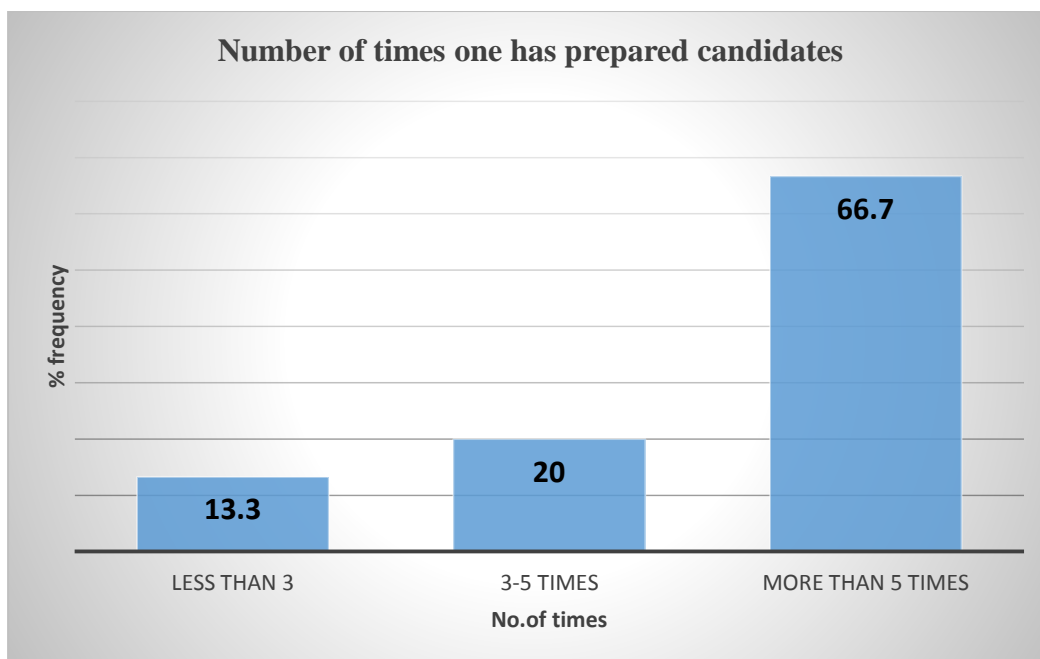
Table 6 shows the experience, in years that teachers have in preparing candidates for KCSE. Preparing candidates for KCSE includes supervising the project and therefore assessing it. It can be noted that 86.7 % of the teachers (26) have prepared candidates at least 3 times and above. This is important as it increases the credibility of the responses in part D of the questionnaire. The information is further summarized in figure 7 below.

Table 6 *Number of times one has prepared candidates*

| Number of times one has prepared candidates ^a | | | | | |
|--|-------------------|-----------|---------|---------------|--------------------|
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | Less than 3 | 4 | 13.3 | 13.3 | 13.3 |
| | 3-5 times | 6 | 20.0 | 20.0 | 33.3 |
| | More than 5 times | 20 | 66.7 | 66.7 | 100.0 |
| | Total | 30 | 100.0 | 100.0 | |
| a. Designation of respondent = Agriculture teacher | | | | | |

Source: Researcher (2015)

Fig. 7 *Number of times one has prepared candidates*



Source: Researcher (2015)

4.4.5 Is respondent a KCSE examiner

In table 7 below, we are told that 27 teachers (90%) are not examiners while only 3 (10%) have trained as examiners for agriculture. A teacher who is trained as an examiner is considered to better skilled in interpreting the syllabus and tipping the candidate on how best to respond to test items.

Table 7 *Is respondent a KCSE examiner*

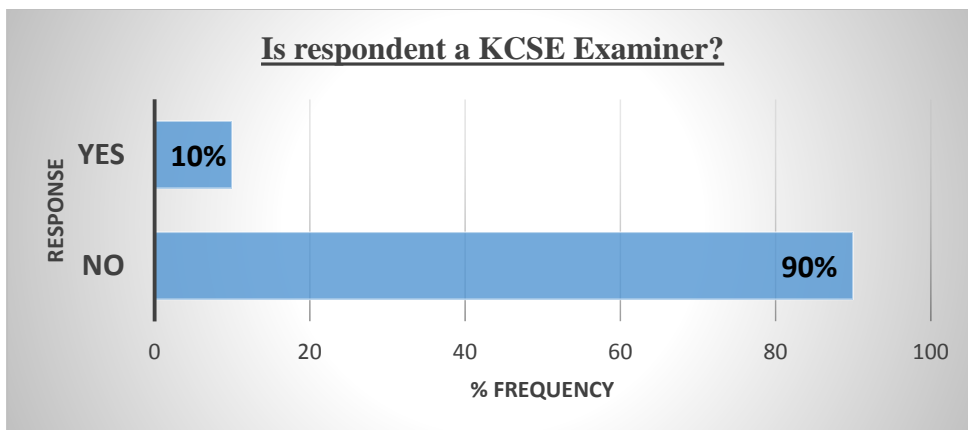
| Is respondent a KCSE examiner^a | | | | | |
|--|-------|-----------|---------|---------------|--------------------|
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | No | 27 | 90.0 | 90.0 | 90.0 |
| | Yes | 3 | 10.0 | 10.0 | 100.0 |
| | Total | 30 | 100.0 | 100.0 | |

a. Designation of respondent = Agriculture teacher

Source: Researcher (2015)

Table 7 is graphically presented in figure 8 below shows the number of agriculture teachers who are examiners in the subject.

Fig. 8 *Is respondent a KCSE examiner*



Source: Researcher (2015)

4.4.6 Workshops attended over last seven years & Workshop organisers

The table below 9 shows the number of workshops on assessment of agriculture which have been organized over the last seven years and the workshop organisers. It reveals that 17 teachers

making up 56.7 % of all the agriculture teachers have not attended any workshop/seminar on the assessment over the last 7 years, and only 13(43.3%) did. Such seminars/workshops are instrumental in highlighting issues that arise in assessing the project, teachers also share knowledge and ideas. Failure to attend such seminars would mean that teachers use outdated skills not only in teaching, but also assessing the project.

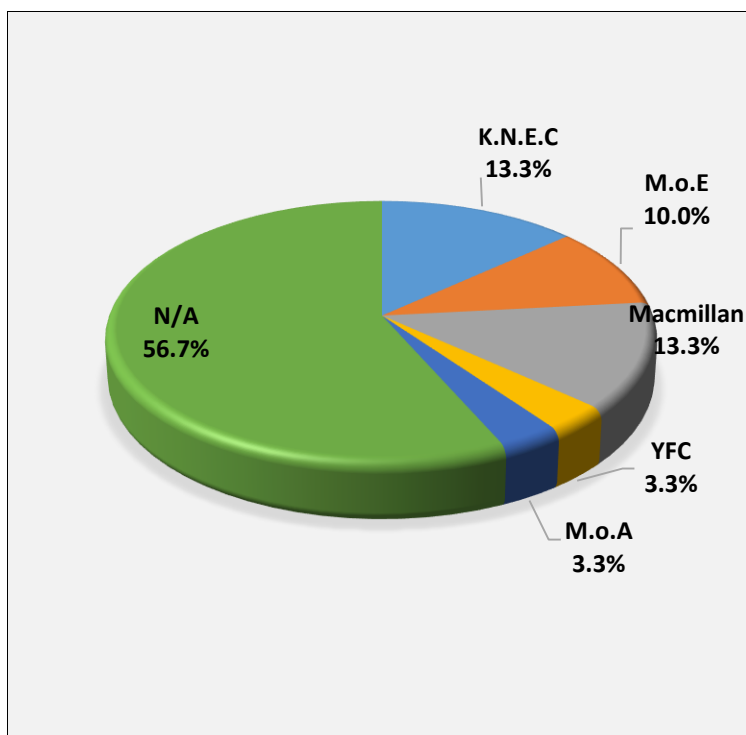
It is also revealed that over the seven year period, a total of 13 workshops are known to have been organized ,where 4 (30.8%) were organized by K.N.E.C and a similar number by Macmillan Publishers, who have since changed their name to Moran Publishers. An organization can use such seminars to collect feedback from teachers.

Table 8 *Workshop organisers*

| Workshop organisers^a | | | | | |
|--|--------------------|-----------|---------|---------------|--------------------|
| | | Frequency | Percent | Valid Percent | Cumulative Percent |
| Valid | K.N.E.C | 4 | 13.3 | 13.3 | 13.3 |
| | M.o..E | 3 | 10.0 | 10.0 | 23.3 |
| | Macmillan | 4 | 13.3 | 13.3 | 36.7 |
| | Young Farmers Club | 1 | 3.3 | 3.3 | 40.0 |
| | M.o.A | 1 | 3.3 | 3.3 | 43.3 |
| | N/A | 17 | 56.7 | 56.7 | 100.0 |
| | Total | 30 | 100.0 | 100.0 | |
| a. Designation of respondent = Agriculture teacher | | | | | |

Source: Researcher (2015)

Fig 9 Workshops attended over last seven years & Workshop organisers



Source: Researcher (2015)

4.5 Research Question One

Do principals and agriculture teachers perceive factors influencing KCSE agriculture project as a challenge in its assessment?

The first objective of the study sought to determine the perception of principals and agriculture teacher towards factors influencing the assessment of KCSE agriculture project as a challenge in its assessment.

This research question sought to establish the how principals and agriculture teachers perceive factors influencing KCSE agriculture project as a challenge in its assessment. This question was put to the principals of the schools that offer agriculture and the agriculture teachers who supervised the project in 2014.

A total of 23 factors influencing the initiation of KCSE agriculture projects in secondary schools, adopted from two studies by Nyang'au et al(2010,2011) were presented to the respondents as statements in questionnaires where they were required to rate how they

perceived each factor as a challenge in assessing the project. The source of data were questionnaires administered to the respondents. To measure their perceptions the respondents were given the factors in the form of statements where they were asked to respond to each factor by rating them appropriately using a scale provided by the researcher. Each factor was rated on a five point likert scale (1=not serious; 2=least serious; 3=serious; 4=very serious; 5=extremely serious). The lowest score a factor could have was 1 and the highest was 5. These scores reflected the respondents' perception of the factors as a challenge.

For each factor, the frequency of respondents to a particular score was multiplied by the score then divided by the number of respondents in the category. This gave the mean score for that level on the scale. The five mean scores were then summed up to give the mean perception rate of the factor. This is illustrated in the tables below.

Table 9(a): *Calculating MPS*

| Respondent Principals | | | | | | |
|------------------------------|----------|----------|----------|----------|----------|-----------|
| Factor | 1 | 2 | 3 | 4 | 5 | N |
| 1.security | 5 | 4 | 7 | 11 | 2 | 29 |
| Mean score | 0.17 | 0.28 | 0.72 | 1.52 | 0.34 | 3.03(MPS) |

Depending on the MPS, the factors were described as in the table below.

Table 9(b): *Description of MPS*

| mean score | description |
|-------------------|--------------------|
| 1.00 - 1.50 | Not serious |
| 1.51 - 2.50 | Least serious |

| | |
|-------------|-------------------|
| 2.51 - 3.50 | Serious |
| 3.51 - 4.50 | Very serious |
| 4.51 - 5.00 | Extremely serious |

Table 10 *Mean Perception of Principals and Agriculture Teachers on Factors influencing KCSE agriculture project as a challenge in its assessment*

| Factor | Principals n=29 | Agriculture teachers n=30 |
|---|----------------------------|--------------------------------------|
| 1 Security of project | 3.03 | 2.7 |
| 2 Suitability of project to local ecological conditions | 2.59 | 1.77 |
| 3 Availability of land for project | 2.86 | 3.1 |
| 4 Project options given by KNEC | 3.03 | 2.03 |
| 5 Availability of inputs for project | 2.69 | 2.87 |
| 6 Cost of project to school | 2.83 | 3.1 |
| 7 School financial resources | 3.03 | 3.07 |
| 8 Availability of tools and equipment | 3.1 | 2.43 |
| 9 Interest of agriculture teacher on project | 2.31 | 2.03 |
| 10 Interest of candidate in project | 2.76 | 2.7 |
| 11 Guidelines given by KNEC | 2.52 | 2.17 |
| 12 Prevailing weather conditions during project | 3.1 | 3.13 |
| 13 Candidates prior exposure to project work | 3.14 | 2.5 |
| 14 Candidates involvement in co-curricular activities | 2.62 | 2.37 |

| | | | |
|------------------------------|---|-------------|-------------|
| 15 | Experience of the teacher | 2.72 | 2.67 |
| 16 | Motivation of teacher during project | 2.66 | 3.7 |
| 17 | Candidate's proficiency in English | 2.9 | 3.13 |
| 18 | Training of teacher in assessment of the project | 2.69 | 3.47 |
| 19 | Follow-up by KNEC during project | 3.41 | 3.47 |
| 20 | Gender of candidates | 1.38 | 1.7 |
| 21 | Candidates attendance to school | 3.14 | 2.83 |
| 22 | Availability of time for candidates to work on project | 2.69 | 2.6 |
| 23 | Availability of time for teacher to monitor the project | 2.66 | 2.3 |
| mean perception score | | 2.78 | 2.69 |

Source Researcher, 2015

The results are presented in table 10 above. The table shows that generally, principals had a fairly higher perception of the factors as challenges compared to the teachers (MPS=2.78 >MPS=2.69). This could probably be owing to the fact that while teachers turn to the principals when there is a problem, the principals have no one to turn to, but have to look for the solution, e.g. when a student disappears from school and yet they are supposed to work on the project.

From the findings, it can be observed that the principals perceived 21 factors as serious (91.3%), 1 factor as least serious (4.35%) while 1 factor (4.35%) was perceived not serious as a challenge. On their part, the teachers perceived 1 factor (4.35%) as very serious, 13 factors (56.52%) as serious and 9 factors (39.13%) as least serious. However, it is in 8 of the factors that both respondents had a MPS of above 3.0. This finding shows that the principals and teachers are in agreement that there are challenges in the assessment of the project. The implication of this perception is that the quality of the assessment and the project itself is undermined thus rendering the scores to be unreliable or of low reliability. This also casts doubt on the validity of the scores as a true measure of what the students' mastery of the subject.

Follow-up by the council is important to ensure that the guidelines are adhered to and also to enhance reliability of the scores where the score awarded by the teacher and the one awarded by the council would be compared. Failure by the council to make follow up leaves room for teachers to bend the guidelines. This augments well with Mwanyumba & Mutwiri (2009) observation that teachers inflate the assessment marks by bending the assessment criteria provided and sometimes submit fake marks. This would be the reason why principals considered it the greatest challenge, rating it as serious (3.41) and teachers rated it highly at 3.47.

Prevailing weather conditions during the project period determines the performance of crop and livestock projects. Mombasa County, found at the coast experiences hot weather conditions most of the year. Rainfall is low and unreliable. This means the weather conditions are not quite favourable to agriculture which affects output and there is a lot of intervention measures required for the projects to do well, increasing the cost. This accounts for the perception of this factor as serious by both principals (3.10) and teachers (3.13). This finding is within expectation owing to the weather conditions in Mombasa County.

Principals and teachers perceived security of the project as a serious challenge with mean rating of 3.03 and 3.07 respectively. Insecurity is likely to cause failure of the project and this would frustrate the teachers and candidates alike because of the effort they have put in. The cause of insecurity is mainly due to human and animal destruction. Most of the schools do not have their compounds fenced against animals and outsiders. Most of the project plots were also found to be near play grounds which increases the risk of destruction. Based on the observations made by the researcher while in the field, this finding is in conformity to the situation on the ground.

Project options were perceived by principals as serious while teachers perceived them as least serious. The council provides schools with a list of project options where a school is supposed to choose based on suitability to ecological conditions, availability of inputs, tools and

equipment among other considerations. The perception by principals is within expectation because there are only two options offered by KNEC, one for animal production and the other for crop production such that although there is choice, in actual sense the choice is restricted. A project can be undertaken anywhere but the requirements will vary from one place to another. The teachers, being the subject specialists know what is required to make the project successful and since it is not their headache to provide the requirements, their rating it as least serious is expected.

Availability of land was perceived as serious by both respondents. In Mombasa, this finding is not unique bearing in mind that most of the schools are found in Changamwe and Mvita districts. Mvita is within the island while Changamwe is densely populated residential and commercial district. The land available to most schools is limited such that most schools have to use vertical space. It is thus not uncommon to find project plots side by side with play grounds on near the kitchen.

Financial resources of the school will dictate the kind of project that a school would choose. Livestock projects are more expensive compared to crop projects and they also require attention on a 24/7 basis. The study, having already revealed that out of the 30 schools, 23 of them (76.7 %) were full day, it follows that choosing a livestock project would mean employing a worker to watch over the animals at night, during weekends and over the holidays. This accounts for the consensus between principals and teachers that the factor poses a serious challenge. Of the 30 schools, none had implemented a livestock project, though it would have been a viable project as it requires little land and most of the schools in the county have scarcity of land. This finding is thus within expectation.

Prior exposure to project work would give the candidates an upper hand in handling the project. However, due to shortage of land, many schools are not able to afford a lower class say form

three run a project alongside that of form four. This means the candidates embark on the project while at form four. This lack of exposure means they would constantly require assistance from the teacher. Prior exposure would also enable the candidates to foresee any problem and deal with it timely. Principals rated this as serious challenge with a mean rating of 3.14 while teachers rated it as least important at 2.5. The teachers probably gave it a lower score because they are the subject specialists so they may be emphasizing the skills at earlier levels and are thus better placed to handle this challenge so they don't see it as a big issue. The variation in perception is within expectation.

Presence of the candidate in school is necessary so that they can undertake all processes of the project. The candidate should also be available when the teacher assesses the project so that they may respond to questions raised. Day schools are marked by cases of absenteeism because it is difficult to trace them when they are not in school. Sometimes candidates register for examinations and disappear from school. This was perceived as serious by both principals and teachers though the former had a higher mean rating of 3.14 compared to the teacher's score of 2.83. This variation may imply that while principals are concerned about the validity of the score awarded, teachers were likely to bend the assessment criteria as in by letting other candidates do the project for the ones absent. This conforms to the finding that at times, teachers submit fake marks. (Mwanyumba & Mutwiri, 2009).

The project requires tools like slashers, jembes for it to be implemented. Upon admission, most schools require that students bring these tools to school as part of the admission requirements. The perception by the principals that this is a serious challenge (3.10) was not expected because students bring these tool every year. It implies that there is poor inventory system in the schools. The perception by teachers as least serious (2.43) is more in conformity to the general expectation.

Teacher motivation was rated by principals as serious (2.66) but teachers rated it as very serious (3.70). When a teacher is motivated, they are able to exert more effort in terms of time for the project such as being in school on weekends, and holidays to take care of it. Agriculture project (443/3) is one of the three papers of the secondary agriculture examination. The teachers who mark the theory papers (443/1,443/2) are paid by the council an average of 50/= for marking every script. The agriculture teachers supervise the project for 9 months from January to September during which they assess, mark project reports and submit scores to the council and yet they are not paid anything in return.

The teachers interviewed on this factor put a lot of blame to the council for ignoring their input and effort. As such, the perception of the teachers that motivation is a very serious challenge is in conformity to what should be expected. The principal's perception of it as serious (2.66) means they side with the council school of thought that the assessment is part of teaching hence they do not need extra payment for assessing the project.

The above perception by teachers also conforms to their perception on training. Teachers felt that lack of training is a serious challenge. Of the 30 teachers who responded, 56.7 % had not attended any training on assessment. Training of the teacher in assessment not only improves the quality of assessment by enhancing its validity but also motivates the teacher because of the certificate obtained.

The performance of students in English has been going down nationally and Mombasa County has not been an exception. Mastery of English is necessary because as part of the project, the candidates are supposed to write a project report. The teachers of agriculture are expected to go through the project report to ensure they conform to rules of report writing especially grammar. This is not different in marking compositions. The candidates' proficiency in English is low and this poses a great challenge to the teachers assessing the project. This satisfactorily

explains its rating as serious (3.13). The lower rating by principals at 2.90 is acceptable because they are not directly involved in marking the project reports. The disparity in rating is thus in conformity to expectations.

Both principals and teachers were in consensus that gender did not pose a serious challenge in assessment. Principals rated it as not serious (1.38) while teachers rated it as least serious (1.70). Agriculture is an elective and those who choose it do so knowing very well it has a project component and are thus prepared for it. This explains why gender of the students is not a challenge in the assessment of the project

4.6 Research Question Two

Is there a difference in in the perception of principals and agriculture teachers towards the challenges in assessing the project?

Research question two sought to compare the perceptions of principals and agriculture teachers towards the challenges facing assessment of KCSE agriculture project. From the findings of research question one, a comparison was made of the mean perception rate of principals and agriculture teachers to determine if there was a significant difference.

Field (2009) asserts that a t test is a versatile statistic which can be used not only to test whether a correlation coefficient is different from 0 or whether a regression coefficient, b , is different from 0 but it can also be used to test whether two group means are significantly different.

An independent samples t-test was conducted to determine if there was a significant difference between principals and agriculture teachers in respect of their perception of factors influencing KCSE agriculture project as a challenge in its assessment. An independent samples test is conducted where different subjects are exposed to the experimental conditions. In our study, the subjects were the principals and agriculture teachers.

The results of the test are presented in the following two tables, table 11(a) and (b)

Table 11(a) summary of t- test results

| Group Statistics | | | | | |
|-------------------------|---------------------|----|--------|----------------|-----------------|
| | respondent | N | Mean | Std. Deviation | Std. Error Mean |
| Mean perception | principal | 23 | 2.7730 | .39813 | .08301 |
| | agriculture teacher | 23 | 2.6870 | .54308 | .11324 |

Table 11(a) summarises the test results and shows that principals had a mean perception score of 2.77 with a standard deviation of 0.398 while agriculture teachers had a mean perception score of 2.69 with a standard deviation of 0.543.

In table 11(b), Lavene’s test gives a p value of $0.063 > 0.05$ which satisfies the assumption of equal variances. The computed t-value is 0.613 at 44 degrees of freedom and a two tailed signifance value of 0.543.

The test did not reveal a statistically significant difference between principals and agriculture teachers ($t=0.0613$, $df=44$, $p>0.05$). Principals ($M=2.77, SD= 0.398$) did not report a significantly higher score than agriculture teachers($M= 2.69, SD =0.543$).

Therefore it was concluded that the difference in perception between principals and agriculture teachers was not statistically significant to be noted hence it could be ignored. Consequently, the experimental hypothesis was reject and the null hypothesis that there was no difference in perception between principals and agriculture teachers towards the factors influencing KCSE agriculture project as a challenge in the assessment of the project was adopted.

The findings tend to depart from the general expectation that since teachers are the subject specialists and actual implementers of the project(Nyang’au et al,2011) and they are the ones assessing it, they would report a significantly higher mean perception score as they are the key players in the project. This departure from expectation may be attributed to the fact that the 23 factors were touching on various aspects of the project which affected the respondents

differently such that a high mean perception score on one factor by teachers was neutralized by a low perception score on another factor by the principals the net effect being no significant difference in perception.

Table 11(b) **Independent Samples Test**

| Independent Samples Test | | | | | | | | | | |
|---------------------------------|-----------------------------|---|-------|------------------------------|-------|-----------------|-----------------|-----------------------|---|---------|
| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | | | | Lower | Upper |
| Mean perception | Equal variances assumed | 3.645 | 0.063 | 0.613 | 44 | 0.543 | 0.08609 | 0.14041 | -0.1969 | 0.36906 |
| | Equal variances not assumed | | | 0.613 | 40.35 | 0.543 | 0.08609 | 0.14041 | -0.1976 | 0.36979 |

This departure from expectation may also be an indication of a good working relationship between the respondents. Teachers are the experts in the subject and as seen in the statistics the teachers are not only experienced, they are also qualified. Principals on the other hand are the administrators who are expected to provide the teachers with the necessary requirements. The absence of a significant difference may suggest that the principals engage the teachers in meaningful and fruitful consultations whenever a challenge arises; teachers use their wide experience to advise the principals how best to overcome the challenge e.g. if the teacher is given air time by the school, he may call parents of absent students and the student may be availed in school within no time. On the other hand, the teacher can talk to students who can

talk to their parents to get traditional methods of dealing with pests and diseases where the school is unable to provide pesticides and other inputs.

4.7 Research Question Three

Are project scores a reliable predictor of students' final score in the subject?

This question was seeking to determine whether project scores awarded by agriculture teachers were reliable in predicting the final score of the student in the subject. This is a critical question bearing in mind that the council has criticized agriculture teachers for inflating project scores and sometimes awarding scores where no project was done at all Mwanyumba and Mutwiri (2009). The final score of the students in the subject as reported in the form of grades was converted to percentage and then analysed descriptively to give the following summary.

Table 12 Summary of statistics from sampled scores

| Statistics | | | |
|------------------------|---------|---------------|-------------|
| | | Project Score | Final Score |
| N | Valid | 231 | 231 |
| | Missing | 0 | 0 |
| Mean | | 74.4675 | 32.6234 |
| Std. Error of Mean | | 0.97153 | 1.07907 |
| Median | | 76 | 28 |
| Mode | | 68 | 21 |
| Std. Deviation | | 14.76593 | 16.40046 |
| Variance | | 218.033 | 268.975 |
| Skewness | | -0.543 | 0.652 |
| Std. Error of Skewness | | 0.16 | 0.16 |
| Kurtosis | | 0.225 | -0.519 |
| Std. Error of Kurtosis | | 0.319 | 0.319 |
| Range | | 80 | 68 |

| | | |
|-------------|----|----|
| Minimum | 18 | 9 |
| Maximum | 98 | 77 |
| Percentiles | 25 | 64 |
| | 50 | 76 |
| | 75 | 85 |

Source Researcher,2015

The above summary indicates that the project score had a higher mean (74.5) compared with the final score (32.6). However, there was a greater spread of scores in the final examination ($\sigma =16.4$) compared with the project ($\sigma =14.8$). This means the project scores were more homogeneous than the final scores. Finally, the distribution of the project scores had a negative skew of -0.543 (skewed slightly to right) while the final score had a positive skew of 0.652 (skewed slightly to left). This shows the performance in the project was slightly better than in the final exam. This result is presented graphically in the figure below.

Fig.10(a) *Boxplots for project score*

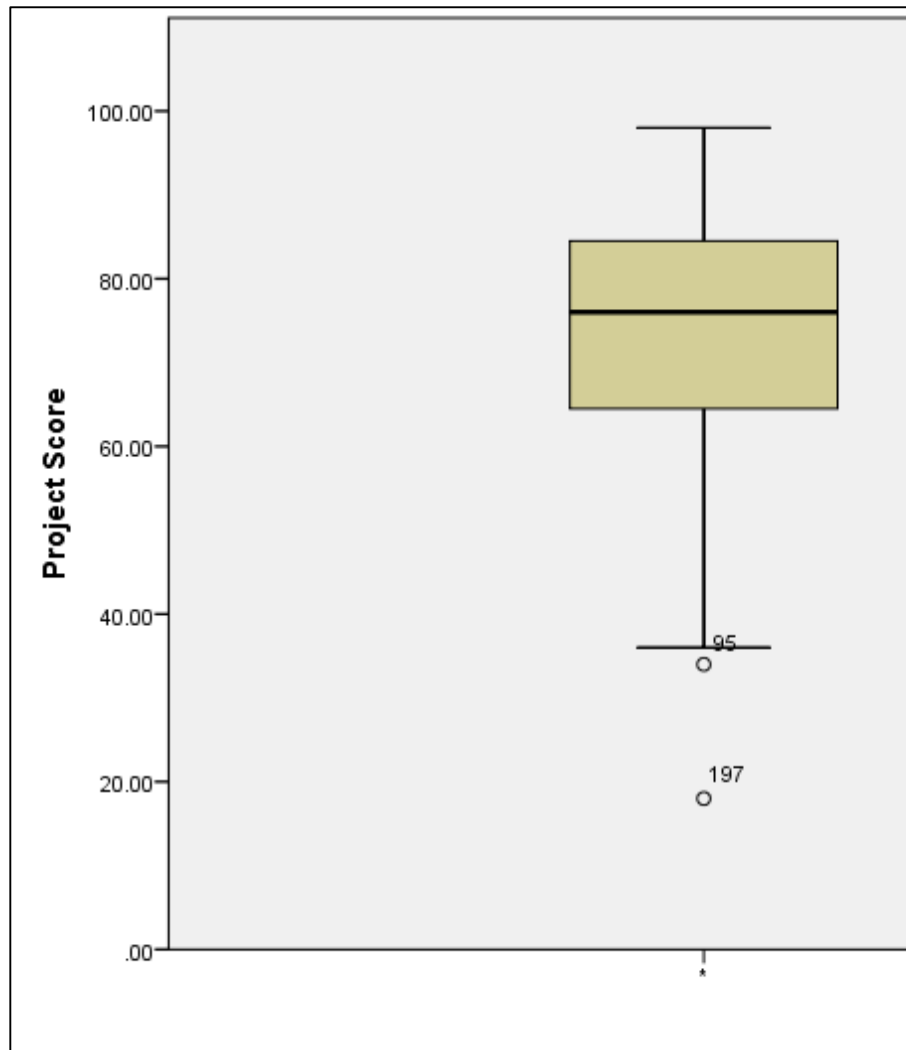
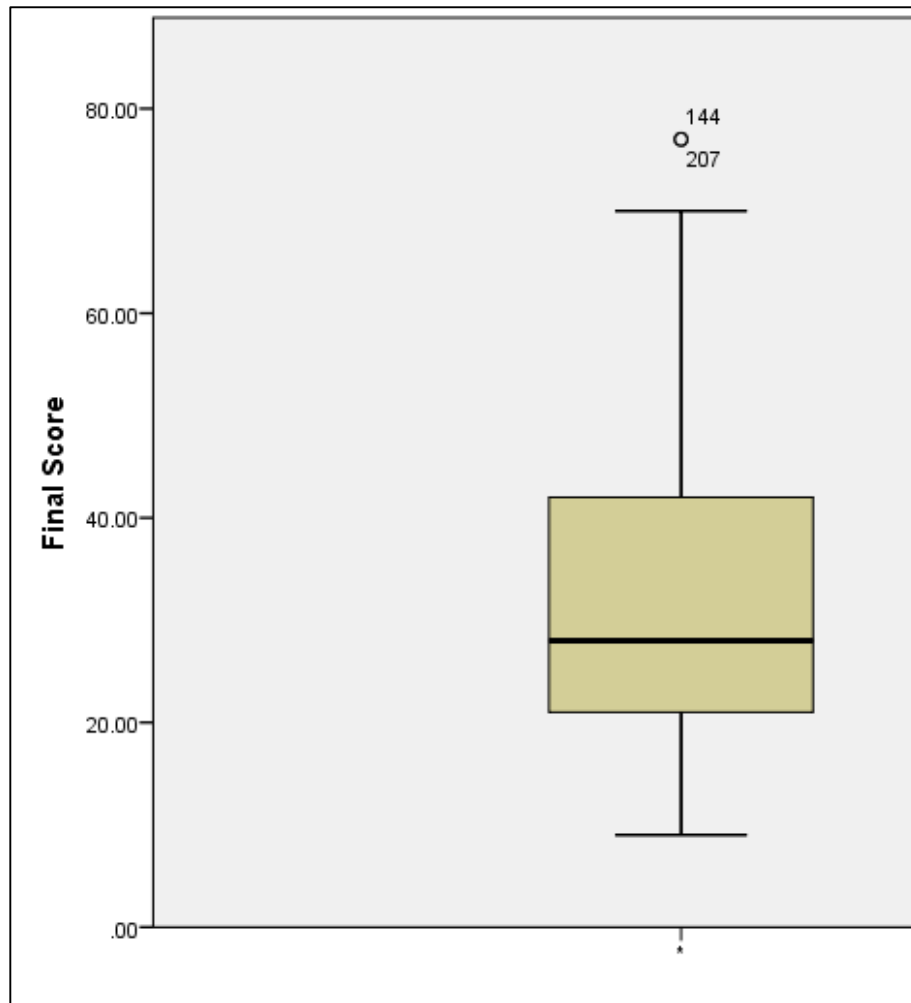


Fig. 10(a) shows the boxplot for project scores. The lowest project score is given as 18 and the highest 98 (after outliers have been eliminated), giving us a range of 80. It also shows that there was greater variability of scores among the bottom 25% of the scores. The negative skew of the distribution is clearly visible from the bottom whisker.

Fig 10(b) shows the final scores. The lowest project score is given as 9 and the highest 77 (after outliers have been eliminated), giving us a range of 68. It also shows that there was greater variability of scores among the top 25% of the scores. The positive skew of the distribution is clearly visible from the top whisker.

Fig.10(b) *Boxplots for final score*



The study thus revealed a wide variation between project scores and final scores where project scores are much higher with a higher median and mean score (76; 74.46) than the final score (28; 32.62)

This finding conforms to earlier findings that project scores submitted by teachers are inflated as indicated by (Mwanyumba & Mutwiri, 2009, KNEC 2013) that inflating project scores disadvantages candidates when standardization is done. This is evidenced clearly in the situation of study where scores have been scaled down dramatically.

4.7.1 Correlational analysis

Correlation analysis is a technique that explains the nature and strength of relationships between variables. Correlation analysis was significant in this study since the study sought to

determine the relationship that exists, if any, between the dependent variable and a set of independent variables. Therefore correlation analysis led this study to answer the third research question and consequently achieve the research objectives of the study.

According to the central limit theorem in big samples the sampling distribution tends to be normal regardless of the shape of the data was actually collected. Field (2009) emphasizes that the sampling distribution would tend to be normal regardless of the population distribution in samples of 30 or more thus as the sample gets bigger then, there can be greater confidence that the sampling distribution is normally distributed. Since our sample size was 231, there was confidence it was normally distributed hence did not require test for normality before running the correlation and regression analysis.

A bivariate correlation using Pearson’s formula was conducted on the project scores against final score. The result shows there was a positive correlation between project scores and final scores and this relationship is clearly demonstrated in the scatterplot below(fig 11). Findings of the correlation analysis in table 13 indicated that the final score was positively correlated with project score. The correlation was significant ($r=0.457$, $p<0.001$). The findings imply that when the project score was high, the final score was high and when the project score was low the final score was low.

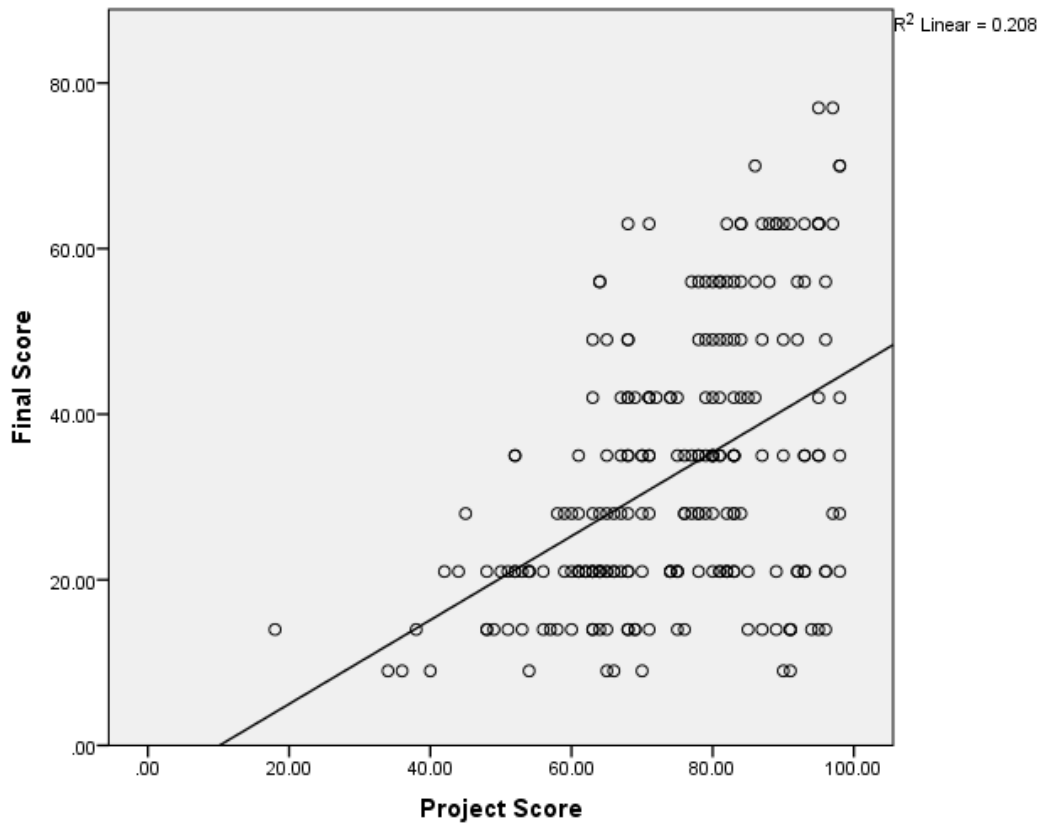
Table 13 Correlations

| Correlations | | | |
|---------------|---------------------|---------------|-------------|
| | | Project Score | Final Score |
| Project Score | Pearson Correlation | 1 | .457** |
| | Sig. (2-tailed) | | 0 |
| | N | 231 | 231 |
| Final Score | Pearson Correlation | .457** | 1 |
| | Sig. (2-tailed) | 0 | |
| | N | 231 | 231 |

** . Correlation is significant at the 0.01 level (2-tailed).

Source Researcher,2015

Fig.11. Scatterplot for project scores against final score



Source Researcher,2015

The above discussions reveal a medium correlation effect, Cohen (1988, 1992). There was thus need to establish if such a large correlation was due to chance or the project score was actually predictive of the final score.

To determine this, a simple regression analysis was done. This is a way of predicting an outcome variable (dependent variable) from one predictor variable /independent variable. If the resulting test statistic is significant that is $p < 0.05$, then it means the predictor variable significantly predicts the outcome variable.

Table 14(a) Simple regression analysis

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | .457 ^a | 0.208 | 0.205 | 14.62366 |

a. Predictors: (Constant), Project Score

Table 14(b) Analysis of Variance

| ANOVA ^a | | | | | | |
|--------------------|------------|----------------|-----|-------------|--------|-------------------|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 12892.282 | 1 | 12892.282 | 60.286 | .000 ^b |
| | Residual | 48971.951 | 229 | 213.851 | | |
| | Total | 61864.234 | 230 | | | |

a. Dependent Variable: Final Score

b. Predictors: (Constant), Project Score

Table 14 above shows the results of the regression analysis. Part (a) of the table tells us that $R=0.457$ which is basically the correlation between project scores and final scores. The positive value shows that the relationship between project scores (predictor variable) and final score (dependent variable) is positive. The table also shows that $R^2=0.208$ implying that project scores account for about 21% of the variation in final score.

Part (b) gives us the results of analysis of variance between the two variables. It gives us a test statistic F of 60.27 which is significant at $p < 0.001$. This means that there would be a less than 0.1% chance that a variance of 60.27 would happen if our null hypothesis were true. Our null hypothesis stated that project scores are not a reliable predictor of final scores.

This implies that our null hypothesis is not true, we reject it and adopt the experimental hypothesis, and thus conclude that project scores significantly predict final scores in agriculture examination.

This finding is well within expectation. Teachers are professionally trained and were awarded the scores deservedly. The apparent inflation of project scores is in part attributed to the marking scheme itself which is largely subjective. In the absence of an external assessor, it is imperative that the project scores were inflated as seen in fig.10(a) and 10(b). However, the teachers know the level of class participation of the student, what grades they have been scoring in the subject and they use this information to distribute the scores and this explains why, though inflated, project scores are reliable predictors of the final score.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of findings, the conclusions drawn and the recommendations made thereof. It finally offers the suggestions for further research.

5.2 Summary of study

This section briefly summarizes the study. The study was conducted to examine the challenges facing school principals and agriculture teachers in the assessment of KCSE agriculture project

and to determine if project scores awarded by teachers were a reliable predictor of the final score the student was awarded by the council. Twenty nine (29) principals, thirty (30) agriculture teachers and project scores and KCSE agriculture results from 231 candidates (2014 cohort) from 30 schools offering agriculture in Mombasa county were involved in the study. Both descriptive and inferential statistics were used to analyse data to reach conclusions in order to answer the research questions posed in the study.

5.3 Summary of findings

This section briefly summarizes the research study findings per each research question which was posed.

5.3.1 Do principals and agriculture teachers perceive factors influencing KCSE agriculture project as a challenge in its assessment?

The study revealed that principals perceived 91% of the factors as serious challenges in the assessment of the project while teachers perceived 56.52% of them as serious challenges and 4.35% as very serious. Both principals and teachers were in consensus that gender of the candidate and interest of the teacher in the project did not offer a challenge in the assessment of the project.

Teacher motivation was seen as the greatest challenge by the teachers while the principals saw follow up by the council as the greatest challenge. Both principals and teachers rated follow-up by the council, prevailing weather conditions during project period and school financial resources as serious challenges at a mean score $m > 3.0$.

Therefore it was concluded that indeed there are challenges facing principals and teachers in the assessment of KCSE agriculture project.

5.3.2 Is there a difference in in the perception of principals and agriculture teachers towards the challenges in assessing the project?

The t-test conducted to compare the mean perception scores of principals and teachers revealed that though the principals had a higher mean perception score (M=2.77) compared to that of the teachers (M=2.69), the difference was not statistically significant hence the conclusion that there was no difference in perception between the principals and teachers towards the challenges in assessing the project.

5.3.3 Are project scores a reliable predictor of students' final score in the subject?

A simple regression analysis of the project scores (predictor variable) on the final score (dependent/outcome variable) found the project scores to significantly predict final scores of students in agriculture examination.

5.4 Conclusions

From the study findings, it can be concluded that there are challenges that face principals and agriculture teachers in assessing KCSE agriculture project in Mombasa. Although the principals and teachers differ on the degree of seriousness of these challenges, they tend to agree on follow up by the council, prevailing weather conditions during the project period and school financial resources as serious challenges. It can also be concluded that agriculture teachers feel the council is unfair to them by motivating them for assessing the project while the principals are not supporting them on this.

It can also be concluded that there is no significant difference in the perception of principals and agriculture teachers towards the challenges facing the assessment of the project, in spite of them differing on the degree of seriousness of these challenges.

Finally, from the findings, it can be concluded that indeed the project scores are inflated by the teachers, they are still reliable in predicting the performance of the student in the final examination. However, this reliability in predicting final score is low and needs to be enhanced.

5.5 Recommendations

Based on the research findings and conclusions, the researcher recommends the following:

The Kenya National Examinations Council to organize for workshops and seminars where teachers can share ideas on how to handle challenges, besides improving the skill of the teacher in assessment of the project.

As it trains examiners for paper 1 and 2, the council should also consider training examiners for paper 3. A trained examiner would be more objective in assessing the project .

After training the teachers to be examiners for paper 3, the council should commission examiners to conduct field assessment of the project. One assessor should be assigned several schools. The external assessor would then average his/her score with the one awarded by the subject teacher and submit to the council the averaged score. This would help to enhance reliability of project scores.

The commissioned examiners should be paid for assessing the projects just like examiners for paper 1 and 2 are paid for marking the theory papers.

Agriculture teachers should take advantage of the presence of universities established in the county to enroll for evening or school based classes in order to advance their career.

Besides the external assessors, the council officials should visit schools frequently to inspect the project as this would assert the importance of the project.

It is also worth noting that Ministry of education and TSC officials are only contracted by the council and thus they get engaged at the onset of the main examinations when the project has long been concluded. The council should be represented permanently at county level by County Examination Officers to manage not only the projects, but also the other examinations.

5.6 Suggestion for further research

The study has identified the challenges facing assessment of KCSE agriculture project and the impact of these challenges on the reliability and validity of the project score in predicting the final score. It focused on all categories of schools. A similar study could be conducted to

compare between rural schools and urban schools, private and public schools to see if they face similar challenges.

Fig 12:KCSE GRADING

| GRADE | SCORE |
|-------|-------|
| A | 81-84 |
| A- | 74-80 |
| B+ | 67-73 |
| B | 60-66 |

| | |
|----|-------|
| B- | 53-59 |
| C+ | 46-52 |
| C | 39-45 |
| C- | 32-38 |
| D+ | 25-31 |
| D | 18-24 |
| D- | 11-17 |
| E | 7-10 |

Source KNEC (available online www.knec.ac.ke/exams)

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APPENDICES

Appendix 1: Survey Questions

The purpose of this survey is to identify the challenges facing school based assessment of agriculture project in Mombasa County with a view to launch a study on how these challenges affect the reliability and validity of overall performance in Agriculture in KCSE.

The information provided shall only be used for research purpose and absolute confidentiality shall be upheld.

Thank you in advance for your co-operation.

GENERAL INSTRUCTIONS.

This questionnaire consists of four parts. Part A concerns your personal information, Part B school information, Part C your professional information and Part D your perception of factors affecting implementation of KCSE project as a challenge in assessment of the project.

Kindly provide your answer according to specific instructions.

PART A: PERSONAL INFORMATION

Please tick inside the box whose attribute describes your personal information

1. Gender Male Female
2. Designation Principal Agriculture teacher
3. Highest Level of education Certificate Diploma Degree Other

If others, please

specify.....

4. Employer Tsc BoM Other

If others, please

specify.....

PART B: SCHOOL DATA

Please tick inside the box whose attribute describes the school where you teach

5. Type of school Public Private
6. Category of school Mixed Girls Boys Day Boarding
7. Location of school Island Mainland

PART C: PROFESSIONAL INFORMATION

Please tick inside the box whose attribute describes your professional information

8. How many years have you taught agriculture 4yrs and below 5-10 yrs above 10yrs
10. How many years have you prepared candidates for kcse less than 3 times 3-5 times more than 5 times
11. Are you an examiner (kcse) for agriculture Yes No
12. If yes what length of experience do you have 4 yrs and below 5-10 yrs above 10 yrs
13. In the last 7 years, how many workshops /seminars on project have you attended none 1-3 4-6 more than 7
14. Who was/were the organisers KNEC Other

If others, please

specify.....

PART D: YOUR PERCEPTION OF FACTORS AFFECTING IMPLEMENTATION OFKCE PROJECT AS A CHALLENGE IN ASSESSMENT OF THE PROJECT.

The following are factors which affect the implementation of the secondary school agriculture project component (443/3) of the Kenya Certificate of Secondary Education Examination offered by the Kenya National Examinations Council.

Please indicate **your perception** of how serious each factor is **as a challenge** in assessing the project using the following scale: 1= **not serious**; 2= **least serious**; 3 = **serious**; 4= **very serious**; 5= **extremely serious** by ticking in the appropriate box.

1 Security of the project

| | | | | |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

| | | | | | | |
|----|--|---|---|---|---|---|
| 2 | Suitability of project to local ecological conditions | 1 | 2 | 3 | 4 | 5 |
| 3 | Availability of land for the project | 1 | 2 | 3 | 4 | 5 |
| 4 | Project options provided by KNEC | 1 | 2 | 3 | 4 | 5 |
| 5 | Availability of inputs for the project | 1 | 2 | 3 | 4 | 5 |
| 6 | Cost of the project | 1 | 2 | 3 | 4 | 5 |
| 7 | Financial resources of the school | 1 | 2 | 3 | 4 | 5 |
| 8 | Availability of tools and equipment for the project | 1 | 2 | 3 | 4 | 5 |
| 9 | Interest of the agriculture teacher on the project | 1 | 2 | 3 | 4 | 5 |
| 10 | Interest of the candidates' in the project | 1 | 2 | 3 | 4 | 5 |
| 11 | Project guidelines provided by KNEC | 1 | 2 | 3 | 4 | 5 |
| 12 | Weather conditions prevailing during the project period | 1 | 2 | 3 | 4 | 5 |
| 13 | Candidates' prior exposure to project work | 1 | 2 | 3 | 4 | 5 |
| 14 | Candidates' involvement in in co-curricular activities | 1 | 2 | 3 | 4 | 5 |
| 15 | Experience of the teacher | 1 | 2 | 3 | 4 | 5 |
| 16 | Motivation of the teacher in the implementation of project | 1 | 2 | 3 | 4 | 5 |
| 17 | Candidates' proficiency in English language | 1 | 2 | 3 | 4 | 5 |
| 18 | Teacher training in assessment of the project | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|----|---|---|---|---|---|---|
| 19 | Follow up by KNEC officials during project period | 1 | 2 | 3 | 4 | 5 |
| 20 | Gender of candidates | 1 | 2 | 3 | 4 | 5 |
| 21 | Candidates' attendance to school | 1 | 2 | 3 | 4 | 5 |
| 22 | Availability of time for candidates to work on project | 1 | 2 | 3 | 4 | 5 |
| 23 | Availability of time for teacher to monitor the project | 1 | 2 | 3 | 4 | 5 |

Thank you.

Appendix ii: Request to collect data

Mr. Malembi Lucas Mgandi,
Changamwe Secondary School,
P.O.Box 93396,
Mombasa.
25th May, 2015.

To
The Principal,

..... School,
Mombasa.

Dear Sir/Madam;

RE: REQUEST TO OBTAIN INFORMATION ON 2014 KCSE AGRICULTURE PROJECT

I am writing in regard to a project I am working on at the University of Nairobi's school of education. I am writing a postgraduate project on the challenges facing assessment of secondary school (KCSE) agriculture project and their impact on reliability and validity of the project scores in predicting the final grade of the students in the subject in Mombasa County.

My project will employ a correlational research design, where an observation is made of what naturally goes on without directly interfering with it and I intend to obtain data from primary sources via questionnaires, which I am circulating. Besides, I will require a copy of each of the following from your school:

- (i) manual mark sheet for the 2014 KCSE agriculture project and
- (ii) K. N. E. C. 2014 KCSE results.

All the information so obtained will be treated with strict confidentiality and used only for the purpose of the said project. Student names, index numbers and school names and code numbers will be held anonymous.

Attached, please find a copy of a letter of authority to conduct the research obtained from the Ministry of Education, Mombasa County

Thanking you in advance

Sincerely,

Malembi Lucas Mgandi



UNIVERSITY OF NAIROBI
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
FACULTY OF ARTS
DEPARTMENT OF PSYCHOLOGY

Telegrams: Varsity Nairobi

P.O. BOX 30197, 00100

Telephone: 318262

NAIROBI

Fax: 3245566

KENYA

Telex 22095 varsity Ke Nairobi, Kenya

6th February , 2015


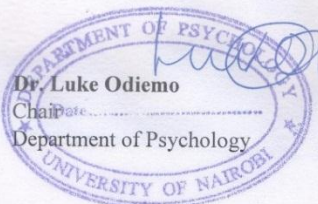
From: Chair Department of Psychology

To: Whoever it may concern

Ref: Request for permission to conduct research

This is to inform you that MALEMBI LUCAS MGANDI of Registration Number E58/63594/2012 is a postgraduate student studying for the degree of Master of Education in Measurement and Evaluation. The student would like to conduct research in your organization.

Please be kind to assist him/her if you do not mind.


Dr. Luke Odiemo
Chair
Department of Psychology




REPUBLIC OF KENYA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
STATE DEPARTMENT OF EDUCATION

Telephone: Mombasa 2315327 /
2230052
When replying please quote
Email: pdcoast@yahoo.com

COUNTY DIRECTOR OF EDUCATION,
MOMBASA COUNTY,
P. O. BOX 90204 - 80100,
MOMBASA.

Ref.MC/ED/GEN/23/5/II

12th February, 2015

Secondary School Principals
MOMBASA COUNTY

RE: RESEARCH AUTHORIZATION
MALEMBI LUCAS MGANDI-E58/63594/2013

The above named, who is a postgraduate student studying for the degree of **Master of Education in Measurement and Evaluation at University of Nairobi**, has been authorized to carry out a **research on the topic "The Challenges Facing Assessment & KCSE Agriculture Project and their impact on Validity and reliability of Student Scores in Mombasa county"** for a period ending **30th September, 2015**.

He will carry out the study in **sampled Secondary Schools in Mombasa**, both **Public and Private Schools**. He will interview **Principals and Teachers**.

Accord him the necessary Co-operation.


Newton E. Okwatsa
FOR: COUNTY DIRECTOR OF EDUCATION
MOMBASA COUNTY

FOR:-
COUNTY DIRECTOR OF EDUCATION
P. O. Box 90204 - 80100
MOMBASA

Copy to: The Chairman Department of Psychology University of Nairobi
P. O. Box 30197-00100
NAIROBI.

Appendix v: Authority from NACOSTI



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471,
2241349, 310571, 2219420
Fax: +254-20-318245, 318249
Email: secretary@nacosti.go.ke
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When replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No. **NACOSTI/P/15/90991/8334**

Date:

17th November, 2015

Lucas Mgandi Malembi
University of Nairobi
P.O. Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *“Challenges facing assessment of secondary school agriculture project and their impact on the reliability and validity of the scores in Mombasa County,”* I am pleased to inform you that you have been authorized to undertake research in **Mombasa County** for a period ending **13th November, 2016.**

You are advised to report to **the County Commissioner and the County Director of Education, Mombasa County** before embarking on the research project.

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


DR. S. K. LANGAT, OGW
FOR: DIRECTOR GENERAL/CEO

Copy to:

The County Commissioner
Mombasa County.

The County Director of Education
Mombasa County.



National Commission for Science, Technology and Innovation is ISO 9001:2008 Certified

Appendix vi: Introduction letter from principal



CHANGAMWE SECONDARY SCHOOL

P.O. BOX 93396 MOMBASA

CSS/LMM/352822/01/2015
Our Ref:..... Your Ref:..... Date..... 04/02/2015

TO WHOM IT MAY CONCERN.

Dear Sir/Madam,

RE: MALEMBI LUCAS MGANDI - TSC NO. 352822.

The above named person is a teacher in our school teaching Geography and economics.

The said teacher who is pursuing Master of Education Degree course at the University of Nairobi has embarked on writing his project.

Kindly assist him with the information he may require.

Yours faithfully,

MS. J. NDIVO
PRINCIPAL.

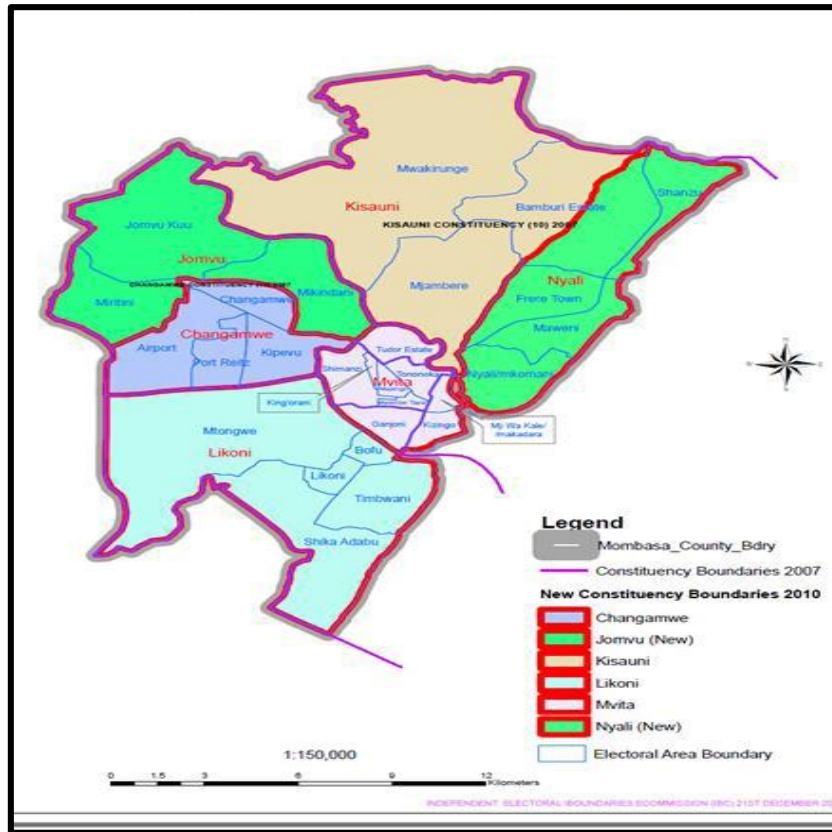
PRINCIPAL
CHANGAMWE SECONDARY SCHOOL
P. O. Box 93396
MOMBASA

Appendix vii: Schools offering agriculture, Mombasa County (2014)

| | SCHOOL | | | AGRICULTURE CANDIDATES |
|----|----------------------|---------|-------|------------------------|
| 1 | CHANGAMWE SEC | Public | Mixed | 49 |
| 2 | CHANGAMWE ADVENTIST | Private | Mixed | 13 |
| 3 | TUDOR DAY | Public | Boys | 16 |
| 4 | CHAANI | Public | Mixed | 2 |
| 5 | ST. PETERS | Private | Mixed | 18 |
| 6 | MWIJABU | Public | Mixed | 8 |
| 7 | MTONGWE | Public | Girls | 36 |
| 8 | MAMA WA SHIME | Private | Mixed | 15 |
| 9 | MTOPANGA | Public | Mixed | 34 |
| 10 | ST.CHARLES | Public | Mixed | 19 |
| 11 | ST THERESAS | Private | Girls | 10 |
| 12 | KAJEMBE | Public | Mixed | 47 |
| 13 | LIKONI SEC | Public | Mixed | 21 |
| 14 | MOI FORCES | Public | Mixed | 18 |
| 15 | SHIKA ADABU | Public | Mixed | 12 |
| 16 | KHAMIS SEC | Public | Boys | 13 |
| 17 | SERANI SECONDARY | Public | Mixed | 6 |
| 18 | MBARAKI GIRLS | Public | Girls | 24 |
| 19 | ALFARSY GIRLS | Public | Girls | 5 |
| 20 | COAST GIRLS | Public | Girls | 28 |
| 21 | STAR OF THE SEA | Public | Girls | 24 |
| 22 | MOMBASA BAPTIST | Private | Mixed | 15 |
| 23 | SHIMO LA TEWA | Public | Boys | 22 |
| 24 | NEWHOPE | Private | Mixed | 5 |
| 25 | SHARIFF NASSIR GIRLS | Public | Girls | 22 |
| 26 | SACRED HEART | Public | Mixed | 14 |
| 27 | MWAKIRUNGE | Public | Mixed | 23 |
| 28 | MSSPH | Public | Boys | 5 |
| 29 | MIRITINI | Public | Mixed | 19 |
| 30 | ST. ELIZABETH | Private | Mixed | 4 |
| | TOTAL | | | 547 |

Source: County Education Office, Mombasa County

Appendix viii: Map of Mombasa County



Source :Mombasa County Government, (2013).