

**FACTORS AFFECTING TEACHING AND LEARNING OF AGRICULTURAL
SCIENCE AS AN OPTIONAL SUBJECT IN SELECTED SECONDARY
SCHOOLS IN TANZANIA**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN
AGRICULTURAL EDUCATION AND EXTENSION OF SOKOINE
UNIVERSITY OF AGRICULTURE. MOROGORO, TANZANIA.**

ABSTRACT

Agriculture as a subject has been taught in Tanzania before and after independence with overall purpose being development of basic agricultural skills relevant to learners' home environment. Thus, this study was conducted to assess factors affecting teaching and learning of agricultural science as an optional subject in selected secondary school in Mbeya and Songwe Regions, Tanzania. Specific objectives were to: examine the current status in teaching and learning of agricultural science as an optional subject; determine school based factors affecting teaching and learning of agricultural science as an optional subject; and determine non-school based factors affecting teaching and learning of agricultural science as an optional subject. Data were collected from 190 respondents including 160 students, 20 teachers, 10 key informants and various documentary sources using questionnaires, researcher's diary and checklist. Quantitative data were analysed using Statistical Package for Social Science (SPSS) computer software and "content analysis" technique was used to analyse qualitative data. The study examined current status of teaching and learning agriculture subject and determined school and non-school based factors affecting teaching and learning of agriculture science as an optional subject. It was concluded that Tanzania Government Policy towards agriculture science subject in secondary schools is that it is an optional and not compulsory. It was recommended that there is a need for the Government to have mechanism in place to periodically review and evaluate policies related to taking agriculture as an optional subject in order to ensure they are still relevant. The study also suggested to undertake case studies of teaching and learning agricultural science as an optional subject in secondary schools in other parts of the country in order to enable generalisation of the observations. The purpose of the case studies would be to develop and enhance understanding of factors affecting teaching and learning of agriculture subject in the country.

DECLARATION

I, **PELAGIA NYIGU**, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work done within the period of registration and that it has neither been submitted nor being concurrently submitted for degree award in any other institution.

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Date

The above declaration is confirmed by;

Prof. R.M. Wambura

(Supervisor)

Date

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ACKNOWLEDGEMENTS

I thank the Almighty God for granting me life and capability of understanding postgraduate studies at Sokoine University of Agriculture (SUA). Special thanks and appreciations are extended to my Supervisor, Prof. R.M. Wambura for his tireless guidance, constant and consistent comments, constructive suggestions and valuable experience, criticism and encouragement throughout my studies. I am thankful for his guidance, patience, moral and material support that made the completion of this work possible.

Many thanks and appreciations are extended to my employer, the Mbeya City Council Executive Director, for granting me study leave that enabled me to pursue Master of Sciences in Agricultural Education and Extension degree programme. I extend my gratitude to all the staff in the Department of Agricultural Extension and Community Development (DAECD) for giving me knowledge and skills during the entire period of studying at SUA, which contributed a lot to the accomplishment of this study and will be useful in my future day to day endeavors. Furthermore, my sincere gratitude is directed to my colleagues in and out of the office, the MSc. AEE Cohort group of students (2014-2016) and other programmes for their social and academic interaction as well as co-operation which contributed to the success of this study.

I wish also to thank the staff and students of Irambo and Shikula secondary schools who volunteered their time so generously which enabled me to collect the necessary data. Finally, I am extremely appreciative of the encouragement and support of my brothers, sisters, uncles, aunts, relatives and their families who took responsibility of my family while I was away during the course of this study.

DEDICATION

This work is dedicated to my lovely son Mkude Ibrahim.

TABLE OF CONTENTS

ABSTRACT.....	ii
DECLARATION.....	iii
COPYRIGHT	iv
ACKNOWLEDGEMENTS	v
DEDICATION.....	vi
TABLE OF CONTENTS	vii
LIST OF TABLES	x
LIST OF FIGURES	xii
LIST OF APPENDICES	xiii
LIST OF ABBREVIATIONS	xiv
CHAPTER ONE	1
1.0 INTRODUCTION	1
1.1 Background Information.....	1
1.2 Statement of the Problem and Justification of the Study.....	5
1.3 Objectives	6
1.3.1 Overall objective.....	6
1.3.2 Specific objectives	6
1.4 Research Questions	6
1.5 Operational Definition of Terms	7
1.5.1 Secondary school.....	7
1.5.2 Agricultural science subject	7
1.5.3 Optional subject.....	7
1.5.4 Teaching and learning.....	8

1.5.5 Key variables.....	8
CHAPTER TWO	9
2.0 LITERATURE REVIEW	9
2.1 Empirical Literature.....	9
2.2 Theoretical Framework.....	11
2.3 Conceptual Framework.....	12
CHAPTER THREE	14
3.0 METHODOLOGY	14
3.1 Study Area	14
3.2 Study Design	14
3.3 Sampling Procedures	14
3.4 Sample Size.....	16
3.5 Data Collection Instruments.....	16
3.6 Data Collection Procedures.....	17
3.7 Data Processing and Analysis	18
3.7.1 Data processing.....	18
3.7.2 Data analysis.....	18
3.8 Limitation of the Study	18
CHAPTER FOUR.....	19
4.0 RESULTS AND DISCUSSIONS	19
4.1 Students Respondents' Characteristics and Their Opinions on Status, School Based Factors and Non-school Based Factors Affecting Teaching and Learning of Agricultural Science as an Optional Subject.....	19

4.1.1	Student respondents' characteristics	19
4.1.2	Status of teaching and learning of agricultural science subject.....	21
4.1.3	Students' opinions on school based factors affecting teaching and learning of agricultural science as an optional subject	26
4.1.4	Students' opinions on non-school based factors affecting teaching and learning of agricultural science subject.....	32
4.2	Teacher Respondents' Characteristics and Their Opinions on Status, School Based Factors and Non-school Based Factors Affecting Teaching and Learning of Agricultural Science as an Optional Subject.....	35
4.2.1	Teacher respondents' characteristics	35
4.2.2	Status of teaching and learning of agricultural science subject	37
4.2.3	Teacher respondents' opinions on school based factors affecting teaching and learning of agricultural science subject.....	38
4.2.4	Teacher respondents opinions on non-school based factors affecting teaching and learning of agricultural science subject	41
4.3	Summary of the Findings.....	42
CHAPTER FIVE.....		43
5.0 CONCLUSIONS AND RECOMMENDATIONS		43
5.1	Conclusions.....	43
5.2	Recommendations	43
REFERENCES		45
APPENDICES		49

LIST OF TABLES

Table 1:	Distribution of all respondents involved in the study	16
Table 2:	Distribution of student respondents' characteristics by their type of school.....	20
Table 3:	Percentage distribution of student respondents' opinions on status of teaching and learning of agricultural science as an optional subject by type of school.....	22
Table 4:	Percentage distribution of student respondents' opinions by availability and adequacy of teaching and learning resources and type of school.....	27
Table 5:	Percentage distribution of student respondents' opinions on degree of understanding for Agricultural science topics and type of school.....	28
Table 6:	Percentage distribution of student respondents' opinions on their reasons for lack of understanding of agriculture topics by type of school	29
Table 7:	Percentage distribution of student respondents' opinions on type and frequency of using teaching/learning resources in agricultural science subject by type of school.....	31
Table 8:	Percentage distribution of student respondents' opinions on non- school based factors affecting teaching and learning of agricultural science subject by their type of school.....	33
Table 9:	Percentage distribution of teacher respondents' characteristics by their type of school.....	36

Table 10:	Percentage distribution of teacher respondents' opinions on status of teaching and learning of agriculture science as an optional subject by type of school.....	38
Table 11:	Percentage distribution of teacher respondents' opinions on adequacy of essential teaching and learning resources by type of school	39
Table 12:	Percentage distribution of Teacher respondents' opinions on methods used in Teaching and learning of agricultural science subject by type of school.....	40

LIST OF FIGURES

Figure 1: Mbeya rural and Mbozi Districts maps showing study wards and
study schools in Mbeya and Songwe Regions4

Figure 2: Conceptual Framework.....13

LIST OF APPENDICES

Appendix 1:	Operational definition of key variables	49
Appendix 2:	Student's questionnaire.....	50
Appendix 3:	Teacher's questionnaire	55
Appendix 4:	Key informants' checklist	60

LIST OF ABBREVIATIONS

DAECD	Department of Agricultural Extension and Community Development
ESR	Education for Self Reliance
GDP	Gross Domestic product
GTZ	German Technical Cooperation Agency
IOSS	Irambo Original Secondary School
MoEVT	Ministry of Education and Vocational Training
NSGRP	National Strategy for Growth and Reduction of Poverty
RAS	Region Administrative Secretary
SEMP	Secondary Education Master Plan
SIDA	Swedish International Development Agency
SNAL	Sokoine National Agriculture Library
SNSS	Shikula New Secondary School
SPSS	Statistical Package for Social Science
SUA	Sokoine University of Agriculture
TIE	Tanzania Institute of Education
URT	United Republic of Tanzania
VETA	Vocational Education and Training Authority

CHAPTER ONE

1.0 INTRODUCTION

This is a study of factors affecting teaching and learning of agricultural science as an optional subject in secondary schools in Tanzania. Since agriculture is the main source of livelihood for majority of Tanzanians who live in rural areas, teaching and learning the subject in secondary schools is very important. Despite the importance of agriculture, there is evidence that the number of students taking agriculture is low. This can be attributed to school and non-school based factors. The purpose of this study was therefore to assess factors affecting teaching and learning agricultural science as an optional subject in selected secondary schools in Mbeya and Songwe Regions.

1.1 Background Information

According to URT (1995), in Tanzania traditional education emphasised principles of good citizenship, acquisition of life skills and perpetuation of valued customs and traditions. During German and English colonial periods, education provided was restricted to few individuals earmarked to serve colonial interests. Immediately after independence in 1961 the Government passed the Education Act. of 1962 to regulate provision of education. This Act. repealed and replaced the Act. of 1927 education ordinance. Despite new policy measures, there were no significant policy changes in the goals and objectives of education until 1967 when the philosophy of education for self-reliance (ESR) was introduced to guide the planning and practice of education. The philosophy of ESR was a sequel of the Arusha Declaration and it underscored the weakness of education system then. This philosophy emphasised the need of curriculum reform in order to integrate theory with acquisition of practical skills. It also urged linkage of education plans and

practices with national socio-economic development and the world of work (Mkamati and Ndosu, 1998).

In 1972, the Ministry of National Education implemented the policy of introducing agriculture and other vocational subjects in secondary school education curriculum (URT, 1995). Secondary school agriculture was therefore made the cornerstone of ESR because the Tanzanian Government places great emphasis on rural development. Agriculture in secondary schools aimed at preparing students for after-school life in rural areas and off-setting some of the costs of running the schools through agricultural production generated by students and teachers (URT, 1995). Delivery of vocational training in Tanzania was therefore partly through the secondary school system, which was diversified in the 1970s with the intention of providing students with vocational skills along side academic knowledge.

After having taught agriculture as a core course in lower secondary school curriculum since its introduction in 1972, it was phased out in 2004 since the secondary school system could only accommodate a small proportion of primary school leavers (MoEVT, 2004). The government had established post-primary training centres offering two-year courses in skills such as metalwork, woodwork, dressmaking and masonry. There were also a number of Folk Development Colleges, set up with support from Swedish International Development Agency (SIDA), offering shorter courses and aimed at providing skills for rural development. Vocational training was also provided at National Vocational Training Centres. In 1994 these came under the newly formed Vocational Education and Training Authority (VETA) which was partly funded by a levy on businesses. VETA colleges offer a wide range of courses, many aim at modern sector jobs (VETA/GTZ, 2000).

However, in 2006 teaching agricultural science subject in secondary schools was reinstated as an optional subject (MoEVT, 2006a), due to poor public perception which has been fueled by the low academic requirements for admission into VETA programmes and the limited prospects for further education and professional development. Worse, the impression is sometimes created by the government that the primary objective of the vocational education track is to keep dropouts and "lockouts" from the basic and secondary school system off the streets, rather than project this type of training as an effective strategy to train skilled workers for the employment market. The term "lockouts" refers to students who are unable to move up the educational ladder, not because of poor grades but because of lack of places at the higher level. The broad objectives of the subject at secondary school level are to: (i) stimulate and sustain students' interest in farming; (ii) enable students acquire basic agricultural attitudes, practical skills and knowledge; (iii) enable students integrate agricultural knowledge and skills; and (iv) prepare students for employment in farming and/or further studies in agriculture (URT, 2000).

Mbeya and Songwe regions (where data for this study were collected) are among the 34 administrative regions in Tanzania. (Fig. 1). The regions have an area of 63420km² (Mbeya 39230.74 km² and Songwe 24 189.26 km²). Administratively the regions are divided into 10 districts. Five districts of Mbeya Region are Mbeya City, Mbeya, Kyela, Rungwe, Mbalari and other five districts of Songwe Region are Momba, Chunya, Songwe, Ileje and Mbozi. Due to fertile soils, favourable rainfall and wide range of altitudes, a considerable number of crops are grown in the regions. Tea is the major cash crop while sunflower, peas, simsim and groundnuts are grown at limited scale by smallholder farmers. Major food crops produced are maize, bananas, paddy, beans and potatoes. The regions had a total number of 251 secondary schools (Mbeya 147 and Songwe 104), out of which 18 secondary schools (Mbeya 11 and Songwe 7) were teaching agricultural science

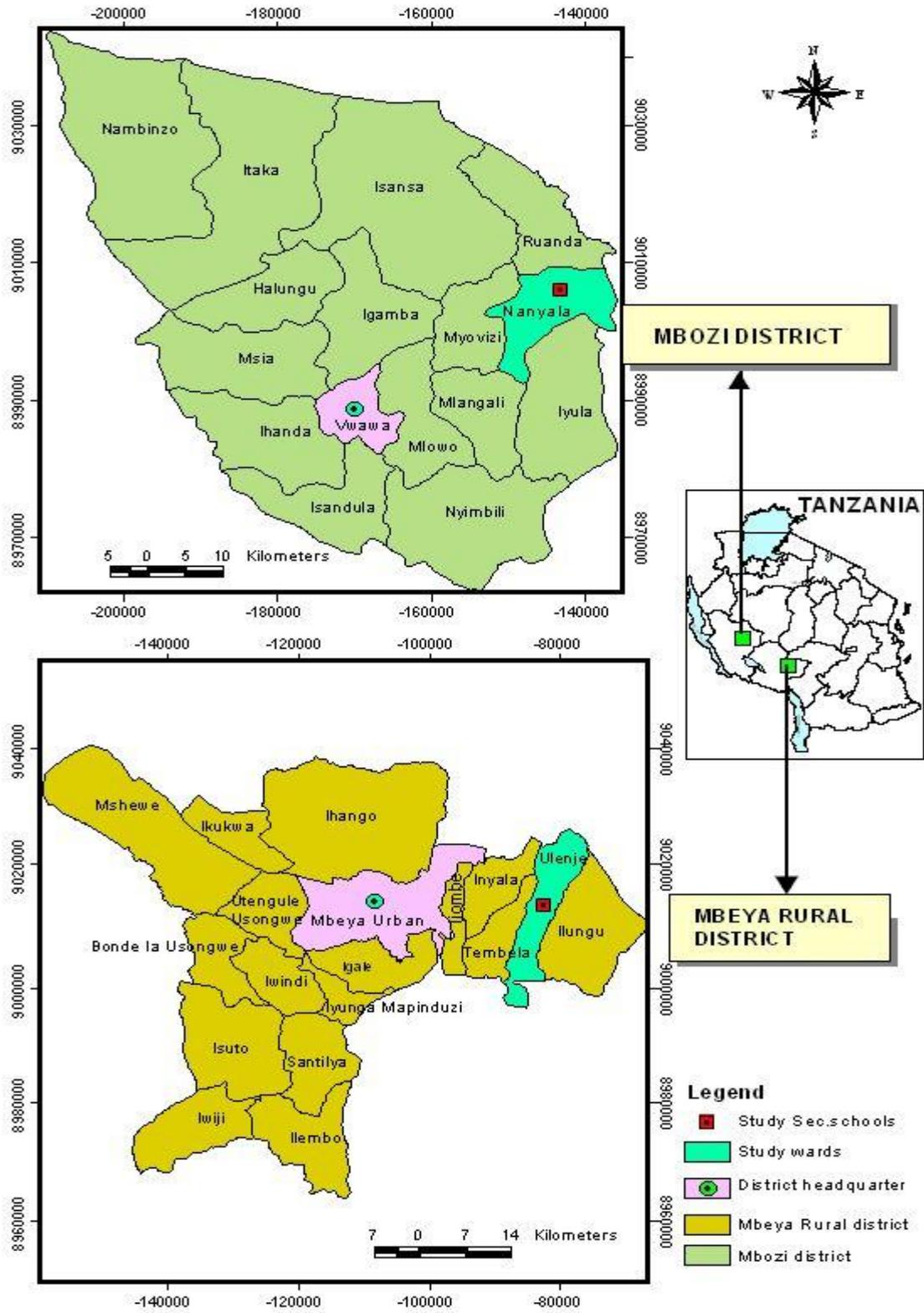


Figure 1: Mbeya rural and Mbozi Districts maps showing study wards and study schools in Mbeya and Songwe Regions

as an optional subject. Factors affecting teaching and learning of Agricultural Science as an optional subject need to be clarified by this study in the study area.

1.2 Statement of the Problem and Justification of the Study

Agriculture is one of the leading sectors in Tanzania's economy. It contributes substantially to the Gross Domestic Product (GDP), accounts for about one fifth of the foreign exchange earnings and supports the livelihoods of more than two thirds of the population (URT, 2010). It has forward linkages with the non-farm sector through agro-processing, consumption and export; provides raw materials to industries and a market for manufactured goods (URT, 2010). Since Agriculture is the main source of livelihood for the majority of Tanzanians who live in rural areas, teaching and learning the subject in secondary schools effectively is very important (World Bank, 2007). Agriculture as a subject has been taught before and after independence with the overall purpose being the development of basic agricultural skills relevant to Tanzania and the learners' home environment (URT, 1999).

Despite the importance of Agriculture, there is evidence that the number of students taking Agriculture is low. This can be attributed to school and non-school based factors. URT (1999), for example, observed that lack of financial resources hindered the expansion of facilities which led to specific problems in vocational subjects like agriculture and development of school farms. It is upon this background that this study aimed at finding out factors affecting teaching and learning of agricultural science as an optional subject in selected secondary schools in Mbeya and Songwe regions, Tanzania. The study is in line with the National Strategy for Growth and Reduction of Poverty (NSGRP) cluster I on growth and reduction of income poverty criteria III, in ensuring creation of productive and decent employment for all, especially women and youth and disadvantaged groups (URT,

2000). Thus, an articulation and identification of factors affecting teaching and learning of agricultural science as an optional subject can result in repositioning the vocational agriculture curriculum for pre-service and in-service vocational education, teacher preparation programme, planning and implementation and can increase the opportunities of the individuals to partake in communities.

1.3 Objectives

1.3.1 Overall objective

To assess factors affecting teaching and learning of agricultural science as an optional subject in selected secondary schools in Mbeya and Songwe Regions, Tanzania.

1.3.2 Specific objectives

- i. To examine the current status in teaching and learning of agricultural science as an optional subject.
- ii. To determine school-based factors affecting teaching and learning of agricultural science as an optional subject.
- iii. To determine the non-school-based factors affecting teaching and learning of agricultural science as an optional subject.

1.4 Research Questions

- i. What is the current status in teaching and learning of agricultural science as an optional subject?
- ii. What school-based factors affect teaching and learning of agricultural science as an optional subject?
- iii. What non-school- based factors affect teaching and learning of agricultural science as an optional subject?

1.5 Operational Definition of Terms

The terms that will be used frequently in the text are defined here in order to provide a common basis of conveying meaning. These include: secondary school; agricultural science subject; optional subject; teaching and learning; and key variables used in the study (Appendix1).

1.5.1 Secondary school

Is a school intermediate between elementary school and college usually offering general, technical, vocational or college preparatory courses or often referred as high school or senior high school which provides secondary education between the ages of 11 and 19 years depending on location after primary education and before higher education (Collins, 2014). In this study the term secondary school will refer to secondary schools teaching agricultural science as an optional subject involved in the study.

1.5.2 Agricultural science subject

According to (URT, 1997), agricultural science subject is a broad multidisciplinary field of biology that encompasses the parts of exact, natural, economic and social sciences that are used in the practice and understanding of agriculture (Veterinary science, but not animal science, is often excluded from the definition). In this study, the term refers to a field of study concerned with application of science in agriculture in the study schools.

1.5.3 Optional subject

A subject that is possible but not compulsory left to personal choice (Collins, 2014). In this study, the term refers to agricultural subject taken as an optional subject in the study schools.

1.5.4 Teaching and learning

Psychologists define learning as the process by which changes in behaviour result from experience or practice. By behaviour psychologists mean any response that an organism makes to its environment. Thus behaviour includes actions, emotions, thoughts and the responses of muscles and glands. Learning can produce changes in any of these forms of behaviour (Mark, 2008). In this study, the terms refer to teaching and learning of agricultural science as an optional subject in the study schools.

1.5.5 Key variables

The operational definition of different key variables (background, independent and dependent variables), as used in the study, is given in Appendix 1. Literature review is presented in the next Chapter.

CHAPTER TWO

2.0 LITERATURE REVIEW

This Chapter reviewed literature from the findings of other studies in order to provide a theoretical framework which guided the development of study model on which analysis of data for the present study was based. It focuses on empirical literature, theoretical framework and conceptual framework.

2.1 Empirical Literature

Secondary school agricultural education programme consists of two main components, namely: classroom/laboratory instruction and supervised agricultural experience. Classroom curriculum and laboratory exercises provide students with foundation knowledge in agricultural practices, preparing them for careers in food, fiber and natural resource industries. Supervised agricultural experiences provide students the opportunity to experience ownership of their own agricultural enterprises or work in the industry. Supervised agricultural experience also enables students to develop skills in agriculture related career areas (Mark, 2008). According to Mark (2008), the educational objectives of secondary school agricultural education and training in sub-Saharan African countries quoted in policy papers, curricula and studies include the following: (i) giving learners knowledge and skills for better agricultural productivity; (ii) making the teaching of sciences more relevant, effective and practical; (iii) influencing learners' attitudes, giving a positive motivation toward agriculture and rural development and (iv) preparing students for entry in higher and tertiary education institutions teaching agriculture.

However, Borg and Gall (2008) observed that the objectives have not been realised, there are still high levels of unemployment due to rural-urban migration, school leavers aspiring

to get white collar-jobs, high levels of poverty and food insecurity in most African countries. Studies (Borg and Gall, 2008) show that few students are willing to take up agriculture careers because of the formed attitude towards the subject. Most African countries have low production in agriculture even though skills and knowledge for better agricultural production are learnt in both primary and post-primary education levels.

Marches and Martin (2002) noted that there are internal factors being encountered within the school as the agriculture curriculum is being implemented in connection to teachers, students, and the teaching learning process. Teachers characteristics are considered a key element for pupils' personal and academic development, the value given from teacher to pupil and vice-versa are usually reciprocal, highlighting additionally the personal relationship. Malila (2003) found that student performance is affected by different factors such as learning abilities because new paradigm about learning assumes that all students can and should learn at higher levels but it should not be considered as constraint because there are other factors like race, gender, sex that can affect student's performance. Process of teaching and learning involves teaching, learning strategies and teaching learning resources. Teaching process is therefore an important school factor affecting teaching and learning of Agriculture in Secondary schools (Fauziah, 2008).

In many African countries, there are regional differences in popularity of agriculture as an optional subject in secondary schools with lower interests in agriculture subject in urban, semi-arid and arid areas. Rural schools serve large numbers of minority student families in socio-economic distress, and many single parent families with little education. Rural students are at risk of low motivation and lack of school success (Corbett, 2009). Most rural schools offer fewer support and extra curriculum programmes overall than the non-rural schools. Local community values may differ from and even conflict with school

based values and goals framed on a national, rather than local model. Schools focus on preparing the youth for lives and job opportunities very differently from the environment where they live (Handre *et al.*, 2009). This indicates why parents would encourage the learners to opt for something different from what they do in the rural homes and that is diverting away from agriculture, for to them it appears not a profitable occupation. Attitude is an inward feeling expressed by outward behaviour. People always project on the outside what they feel in the inside. Borg and Gall (2008) noted that attitudes generally consist of three components; affective, cognitive and behavioural. Affective referring to individuals feelings about the attitude object, cognitive is an individual belief or knowledge about the attitude object and behavioural an individual predisposition to act towards the attitudes object in a particular way.

This section has reviewed empirical literature on the status of agriculture science subject in secondary schools, school based and non-school based factors affecting learning of agriculture science subject in secondary schools. Literature has revealed that the school factors affecting the teaching of Agriculture revolve around the characteristics of the teaching staff, students' characteristics and teaching and learning process. The study sought to fill the existing gaps in the literature on the factors affecting teaching and learning of agricultural science as an optional subject in secondary schools in the study area.

2.2 Theoretical Framework

The study is based on Mitzel (1969) theoretical model. The model advances the view that teaching involves interplay between sets of variables: teachers and students, their interactions and the product of those interactions. Dunkin and Biddle (1974) expanded on the Mitzel model to include four major variable types, which are: presage, context, process

and product. The presage variable includes teacher personality, preparation, general characteristics, background, competencies and inadequacies, teacher education experiences and teacher properties. The context variable addresses the student characteristics and classroom environment. Process variables show the interaction or interrelationship between the teacher and the student. Smith *et al.* (2004) reported that all activities within the classrooms are considered process variables. The product variables are those associated with the effect of instruction. Mitzel's model recognises the presage variables as fundamental in understanding classroom problems and challenges using the experience of the teacher. The experience of the classroom teacher and the availability of teaching and learning resources tend to affect the learning environment (context), interaction between the teacher and the students (process) and effects of the instruction (product). On the other hand, the non-school factors such as the climate may affect the learners' attitude towards the teaching and learning of Agriculture. The study adopted Mitzel's model and investigated the related factors affecting the teaching and learning of agricultural science in selected secondary schools in Mbeya and Songwe Regions.

2.3 Conceptual Framework

The literature from the present Chapter has been reviewed from a wider perspective of teaching and learning of agricultural science subject in secondary schools. The reflections drawn in this review provides the basis for assessing factors affecting teaching and learning of agricultural science as an optional subject in Tanzania. In the context of the present study, the purpose of which was to assess factors affecting teaching and learning of agricultural science as an optional subject in selected secondary schools in Mbeya and Songwe Regions, Tanzania, a conceptual framework shown in Fig. 2 was developed. This conceptual framework is for analysing a large volume of data and is oriented towards establishing variables which fulfil the objectives of the study. The framework provides a

means of organising and understanding the variables used in this study which are teachers, students, process and product variables. It is comprehensive in that the teacher variable is fundamental in understanding classroom problems and challenges using experience of the classroom teacher. Under the school factors experience of the classroom teacher tends to affect the classroom environment (students) interaction between teacher and students (process) and the effects of interaction (product). On the other hand, the non-school factors such climate may affect students attitude towards agriculture as a subject which, in turn, affects teaching and learning.

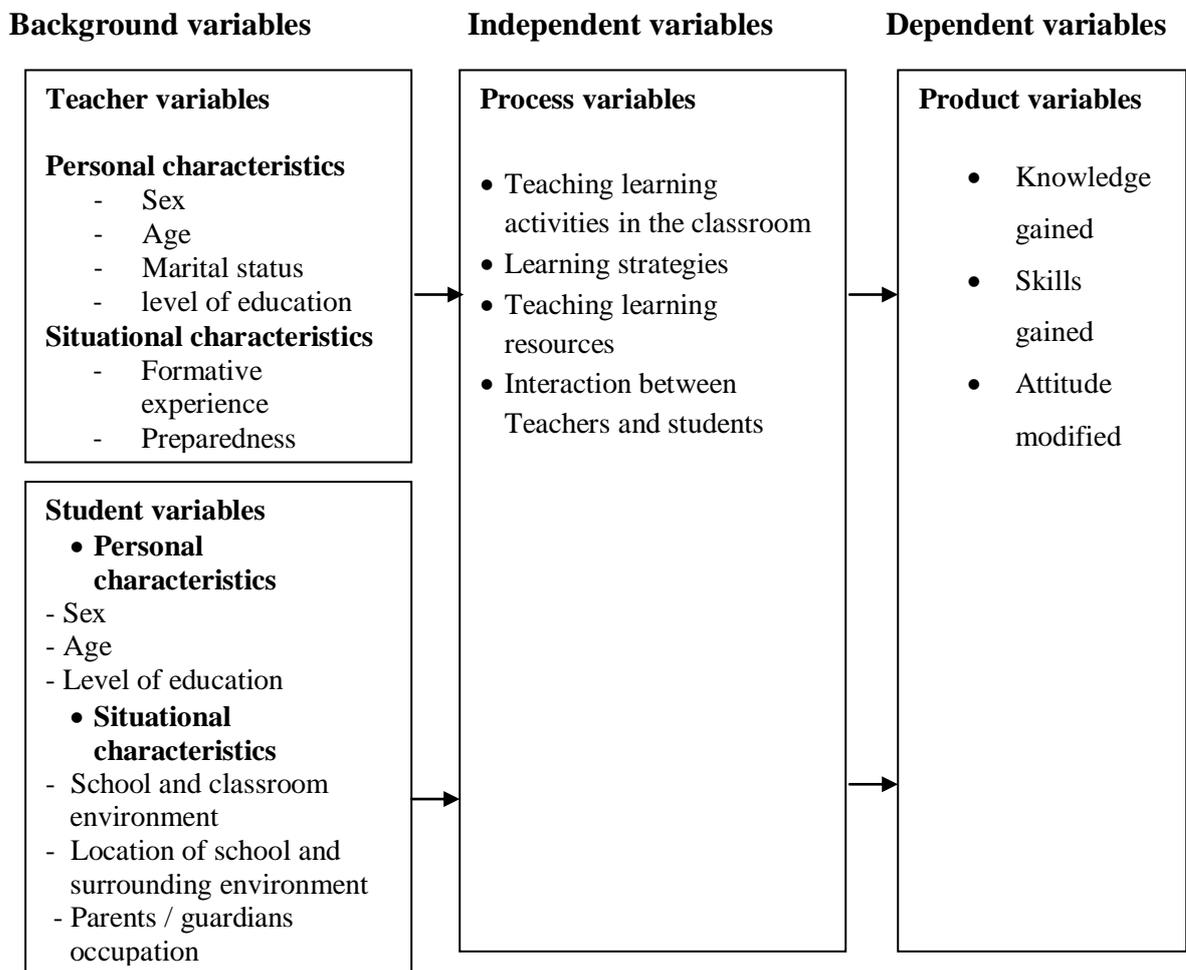


Figure 2: Conceptual Framework

CHAPTER THREE

3.0 METHODOLOGY

This study sought to assess factors affecting teaching and learning of agricultural science as an optional subject in selected secondary schools in Mbeya and Songwe Regions. This Chapter discusses the research methodology adopted under eight parts: (a) study area; (b) study design; (c) sampling procedures; (d) sample size; (e) data collection instruments; (f) data collection procedures; (g) data processing and analysis and (h) limitation of the study.

3.1 Study Area

The study was conducted in selected secondary schools namely: Irambo from Mbeya Region and Shikula from Songwe Region. The schools were purposively selected to represent other schools in Tanzania which are involved in teaching and learning of agricultural science as an optional subject.

3.2 Study Design

The study employed a cross-sectional research design. The design allows data collection at a single point in time and is most appropriate for sample descriptive interpretations as well as determination of relationships between and among variables (Bailey, 1998).

3.3 Sampling Procedures

The sampling procedure involved multistage sampling technique. It mainly involved purposive selection of study area and study respondents based on availability of schools which are involved in teaching and learning of agricultural science as an optional subject. The technique was done under two main stages.

Stage 1: First sampling stage involved stratification of agricultural secondary schools in Mbeya and Songwe regions which were involved in teaching agricultural science subject before it was phased out in 2004 and after it was reinstated in 2006 as a compulsory and optional subject, respectively, on one hand; and on the other hand, those which started teaching the subject in 2006. There were 30 secondary schools involved in teaching agricultural science subject before it was phased out in 2004 as a compulsory subject and after it was reinstated as an optional subject in 2006; and 18 secondary schools which started teaching after it was reinstated. Thus purposive sampling of one school from each stratum, namely: Irambo and Shikula secondary schools from Mbeya and Songwe regions, respectively.

Stage 2: Second sampling stage involved selection of study respondents. A sample of 160 students was selected from the two selected schools (80 students from each school). To get that sample, stratified and random sampling techniques were used to obtain student respondents in respective classes of each school by class level and gender, as follows: a class list from students' record office comprising names of all students in the particular class were used as a sampling frame. Sampling interval were obtained by dividing total number of students in form 1 – 4 streams having a minimum number of 40 students by the required sample size (n) of 20 students from each stream. As a starting point, a random selection of students according to gender and then every Nth student in the list was selected, in this way a sample size of 80 students in each school (40 male and 40 female) from each school was obtained, thus making a total sample size of 160 students (80 male and 80 female).

A total number of 20 teachers from the two selected schools (10 from each school) were selected purposively and involved in the study. In addition, a total number of 10 key

informants were selected using snowball technique. Thus, making a total sample size of 180 (students and teachers) respondents and 10 key informants who were involved in the study.

3.4 Sample Size

A total sample size of 190 respondents comprising of 160 students, 20 teachers and 10 key informants was selected and involved in the study. The distribution of all respondents involved in the study is shown in Table 1.

Table 1: Distribution of all respondents (n=190) involved in the study

Type of respondents	Number		Total
	Male	Female	
Students	80	80	160
Teachers	10	10	20
Key informants	08	02	10
Total	98	92	190

3.5 Data Collection Instruments

- (a) Questionnaires: Two types of questionnaires were used, as follows: (i) Students questionnaire-used to collect primary data from students in each school and (ii) Teachers questionnaire-used to collect primary data from teachers in each school.
- (b) Researcher's diary: This was used to collect secondary data from different sources, including: books, journals, official reports, school reports, district reports, internet, research reports from various institutions, such as Sokoine National Agriculture Library (SNAL) and other relevant literature both within and outside Tanzania.

This instrument was also used to record researcher's observations of school activities.

- (c) Checklist: Checklist was used to collect primary data from key informants to supplement information gathered through interview schedules and researchers diary.

3.6 Data Collection Procedures

The procedure for field data collection begun after receiving permission letter from SUA Administration, which was presented to the RAS for Mbeya and Songwe regions as well as school leaders before starting collecting data. This was followed by pilot study to ask for background information and familiarise with the study area, which involved pretesting data collection instruments in order to check for their validity and reliability before being subjected to the field. Actual fieldwork was done from October to December 2015 whereby qualitative and quantitative data collection techniques and procedures were deployed.

In each of the two selected schools, data were collected by the researcher using interview schedule, checklist and researcher's diary. Interviews were conducted with students and teachers individually and each took about 30 minutes. Direct researcher's observations were made to verify some of the information given during the survey. In addition, primary data were collected using checklist from 10 key informants through directed discussions. The researcher also collected secondary data through review of documentary information from Sokoine National Agricultural library, internet websites and official reports from the Regional, districts and school files using researcher's diary. Observations made on school agricultural activities were also recorded.

3.7 Data Processing and Analysis

3.7.1 Data processing

Data from completed student's questionnaire were coded for computer analysis. Data from teacher's questionnaire, researcher's diary and checklist were summarised manually to single sheets of paper. In summarising data, great care was taken to ensure that it accurately reflect the original meanings of the statements made.

3.7.2 Data analysis

Data processed from student questionnaires were analysed using programme for Statistical Package for Social Science (SPSS). The method of analysis involved univariate and bivariate analysis. It used the techniques of frequency counts, cross-tabulations, means and percentages. Furthermore, data processed from other sources were analysed using "content analysis" technique, which mainly involved clustering information into sub-themes. Quantitative data were processed and analysed to produce frequencies to facilitate assessment of factors affecting teaching and learning of agricultural science as an optional subject in selected secondary schools in the study area.

3.8 Limitation of the Study

Student respondents were involved in preparations for final examinations when data were being collected for this study. The time for interviews had therefore to be rescheduled, as a result data collection period had to be prolonged.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSIONS

This Chapter presents the major results and discussions arising from data analysis related to factors affecting teaching and learning of agricultural science as an optional subject in selected Secondary Schools in Mbeya and Songwe Regions, Tanzania. These were discussed under two main sections: The first section deals with students respondents' characteristics and their opinions on status, school based factors and non-school based factors affecting teaching and learning of agricultural science as an optional subject. Finally, the second section focuses on teachers respondents' characteristics and their opinions on status, school based and non-school based factors affecting teaching and learning of agricultural science as an optional subject.

4.1 Students Respondents' Characteristics and Their Opinions on Status, School Based Factors and Non-school Based Factors Affecting Teaching and Learning of Agricultural Science as an Optional Subject

4.1.1 Student respondents' characteristics

Students respondents' characteristics are those things which every learner has, but which may not be common to all learners. Those investigated in this study were: sex, age, level of education and parents/guardians occupation, as given in Table 2. Examination of student respondents' sex revealed that of 160 respondents, 80 were male and 80 were female {(40 male and 40 female from Irambo original secondary school (IOSS), which was also the case with regard to Shikula new secondary school (SNSS)}. This implies that distribution of sample size by sex and school was similar. Further examination of the student respondents' characteristics is organised under the following sub headings: age, level of education and parents'/guardians' occupation.

Table 2: Distribution of student respondents' (n=160) characteristics by their type of school

Students characteristics	Type of school	
	IOSS (n=80)	SNSS (n=80)
	%	%
Sex		
Male	50.0	50.0
Female	50.0	50.0
Age		
13 – 15	18.8	27.5
16 – 18	81.3	72.6
Level of education		
Form I	25.0	25.0
Form II	25.0	25.0
Form III	25.0	25.0
Form IV	25.0	25.0
Parents/guardians occupation		
Farmer	68.8	77.4
Employed	17.4	8.8
Business	13.8	13.8

IOSS=Irambo Original Secondary School

SNSS=Shikula New Secondary School.

(a) Age

Considering that cognitive development and maturity (which are associated with age) are necessary for worthwhile performance of student respondents, IOSS and SNSS student respondent's age was sought as given in Table 2. Results in Table 2 show that age distribution of students was between 13 and 18 years. The findings further revealed that about 19 and 28 percent of the student respondents from IOSS and SNSS, respectively, were below 16 years of age and the situation was not very different when it came to those with 16 years and above. This implies that students age status in both the study schools was almost similar.

(b) Level of education

Secondary education in Tanzania has two levels, namely Ordinary and Advanced levels. Ordinary Level (O'Level) is Form I-IV, after which certificate is issued all passing the certificate in Secondary Education. Selected students may progress to Advanced level (A'Level) education Form V-VI or study for ordinary Diploma in Technical College (URT, 1995). Results in Table 2 show that level of education in both schools was Form I-IV. Thus implying that the status of level of education in the study schools could not significantly affect the study findings.

(c) Parents'/guardians' occupation

Considering the fact that school and classroom environment as well as location and surrounding environment are important factors for student academic achievement, there is also an ever increasing awareness of parents'/guardians' role in the progress and educational development of children. Student respondents were therefore asked to mention their parents'/guardians' major occupation, as shown in Table 2. The purpose was to determine the economic activities done by their parents/guardians and see if these influence in supporting students education. The findings in Table 2 show that about 69 and 77 percent of the respondents from IOSS and SNSS, respectively, reported that their parents/guardians were farmers. Thus indicating that farming was an important occupation for students' parents/guardians in both study schools. This implies that parents/guardians would encourage the learners to opt for agriculture, if for them it appears a profitable occupation.

4.1.2 Status of teaching and learning of agricultural science subject

Student respondents' opinions were sought on teaching and learning of agricultural science as an optional subject in IOSS and SNSS, as summarised in Table 3 and described

under seven parts, namely: (i) personal interest; (ii) school policy; (iii) parent's influence; (iv) teacher's influence; (v) gender; (vi) performance in agriculture; and (vii) consider taking agriculture related career after secondary education.

Table 3: Percentage distribution of student respondents' (n=160) opinions on status of teaching and learning of agricultural science as an optional subject by type of school

Statement	Type of school	
	IOSS (n=80)	SNSS (n=80)
	%	%
Personal interest	63.8	75.4
School policy	12.5	39.3
Parents /gurdians influence	1.2	0.0
Teacher's influence	13.8	21.3
Gender	3.8	1.6
Performance in Agriculture	12.5	8.2
Consider taking agriculture oriented career after secondary education	75.0	85.0

IOSS=Irambo Original Secondary School

SNSS= Shikula New Secondary School

(i) Personal interest

Considering that personal interest has been hypothesised to be relatively enduring disposition to attend to certain objects and activities, and it associates with positive effect, persistence and learning (Hidi and Ainley, 2002), student respondents were asked whether the decision to study agriculture science as an optional subject was due to their personal interest. Results in Table 3 show that the majority (about 64% of the respondents from IOSS and 75% from SNSS) stated that it was due to their personal interest. This implies that the respondents were motivated by intrinsic reward after recognising that, in the pursuit of interest they would draw and master agriculture subject knowledge, skills and not just demonstrate them.

(ii) School policy

It was assumed that policies are essential part of every school, student respondents were therefore asked whether their decision to study agriculture was due to their school policy. Results in Table 3 show that only about 13% of the respondents from IOSS and 39% from SNSS stated that it was due to school policy. Further investigation revealed that the existing government policy is taking agriculture at secondary school level as an optional subject. It would seem that the government should have mechanisms in place to periodically review and evaluate policies related to taking agriculture as an optional subject in order to ensure they are still relevant. The review process may highlight a need for ammendments or even significant re-writing of the policies.

(iii) Parents/guardians influence

It was expected that parents/guardians have strong impact on their children and the potential to shape their orientation toward achievement. Student respondents were therefore asked if decision to study agricultural science as an optional subject was influenced by their parents/guardians. Results in Table 3 show that only about 1% of the student respondents from IOSS and none from SNSS had been influenced by their parents /guardians. These results might be a reflection of involvement of low level (Form I to IV) secondary school students in the study. Incase of high level students, studies (Trice and Knapp, 1992) have revealed that in students career aspirations and choices, the family environment also has an influence upon their decision, including parental occupations, parental education, socio-economic status, parental beliefs and so forth. Consistently, children see their parents/guardians, as persons who have the greatest impact on their academic achievement and they tend to change their choices if they do not receive the support from their parents/guardians.

(iv) Teacher's influence

Considering that in the school environment, teacher plays an important role on students' career decision, student respondents were asked whether their decision to study agriculture as an optional subject was influenced by their teachers. Results in Table 3 show that the minority (about 14% from IOSS and 21% from SNSS) had positive response. These findings suggest that there is a need for school teachers to consider more seriously their role of encouraging students to take certain subject options that are congruent with student aptitudes and abilities they identify.

(v) Gender

It was assumed that there were gender differences in students' perceptions about their decision of taking agricultural science as an optional subject. Results in Table 3 show that only about 4% and 2% of the student respondents from IOSS and SNSS, respectively, responded positively. These findings are surprising since they suggest that the majority of the student respondents had not reached a degree of readiness which pursues commitments to particular vocation or career subject. Further investigation from key informants revealed that gender differences in learners' experiences starts at pre-school and continue throughout educational careers. Teachers like parents are viewed as key players in the career paths that young people eventually pursue, especially girls. It is therefore suggested that all stakeholders in education should continue to encourage both male and female students to offer subjects of their choice, which invariably influences their agriculture career readiness.

(vi) Performance in agriculture

Considering that student academic performance is affected by a number of pedagogical and socio-psychological factors or intervening variables, student respondents were asked

to state whether their decision to study agriculture as an optional subject was due to the academic performance in the subject. Results in Table 3 show that only about 13% and 8% of the respondents from IOSS and SNSS, respectively, responded positively. This suggests that most of the student respondents did not opt for agriculture due to their academic performance in the subject. Further investigation from key informants revealed that the decision to opt for the subject was made immediately when they joined form I. This implies that students might have decided to opt for the subject due to many other factors that influence students' academic performance, such as teachers, peers, school and classroom environment, parents, social values, socio-economic status and student experience about agriculture.

(vii) Consider taking agriculture oriented career after secondary education

It was expected that the study of agricultural science in our schools is of paramount importance, in the growth and development of our country. Student respondents were therefore asked whether their decision to take agriculture as an optional subject was due to their considering to take agricultural related career after secondary education. Results in Table 3 indicate that the majority (75% of the respondents from IOSS and 85% from SNSS) had positive response. These findings are in agreement with one of the aims of teaching agriculture science in the country which states: “to prepare students for tertiary and higher education, vocational, technical and professional training (URT, 1997)”. This implies that the Department of Curriculum under the Ministry of Education and Tanzania Government should make agriculture science a core subject in the schools and reinforce practical aspects of it more vigorously as a skill for all without drawing a dycotomy in the study of the subject.

In general, on the basis of student respondents 'opinions given in Table 3, this section can be concluded that the government should have mechanisms in place to periodically review

and evaluate policies related to taking agriculture as an optional subject in order to ensure they are still relevant. The review process may highlight a need for amendments or even significant re-writing of the policies, which would lead to making agriculture as a core subject in secondary schools.

4.1.3 Students' opinions on school based factors affecting teaching and learning of agricultural science as an optional subject

Assuming that the adequacy of human and material resources for teaching and learning for skills-based agricultural science subject is vital, student respondents' opinions were sought on school based factors affecting teaching and learning of agricultural subject, and their responses are summarised under the following sub-headings: (i) availability and adequacy of teaching and learning resources; (ii) degree of students' understanding of some topics; (iii) reasons for lack of students' understanding of some topics; and (iv) types and frequency of using teaching and learning resources.

(i) Availability and adequacy of teaching and learning resources

In order to establish the availability and adequacy of teaching and learning resources used in the study schools, IOSS and SNSS student respondents' were asked to rate the level of adequacy of teaching and learning resources in their schools, as presented in Table 4. Overall, results in Table 4 show that the majority (82.5% and above) of the respondents from both schools stated that school farm was available and adequate. This indicates that the study schools had adequate land for agricultural practices. This is a strong factor that could positively enhance students' positive attitude towards agriculture. On the other hand, the findings in Table 4 show that there was inadequacy of human and other material resources in the study schools. With this existing condition, it is difficult for schools to have their graduates skilled in field of agriculture. They may be good in theory aspect of

their course but different in practical aspect. This implies that the inadequacy of qualified agricultural teachers and shortfall in material resources affect the practical skill of acquisition required to produce skilled graduates. It is therefore paramount for school administrators to put in more efforts to make sure that skill-based agriculture subject courses have adequate human and material resources. This can be done by sourcing funds from all possible avenues, including local and international communities.

Table 4: Percentage distribution of student respondents' (n=160) opinions by availability and adequacy of teaching and learning resources and type of school

Resources	Adequate		Inadequate		Not in usable Condition		Not available	
	IOSS (n=80) %	SNSS (n=80) %	IOSS (n=80) %	SNSS (n=80) %	IOSS (n=80) %	SNSS (n=80) %	IOSS (n=80) %	SNSS (n=80) %
Teachers	3.7	2.0	96.3	98.0	0.0	0.0	0.0	0.0
Textbooks	6.2	4.0	43.8	96.0	10.0	0.0	40.0	0.0
School farm	82.5	95.0	15.0	5.0	2.5	0.0	0.0	0.0
Agriculture tools	15.0	1.3	51.3	91.3	21.3	7.4	12.4	0.0
Agriculture rooms/class	43.7	2.5	20.0	81.2	21.3	11.3	15.0	5.0
Computers	2.5	0.0	17.5	3.7	62.5	7.5	17.5	88.8
Livestock units/tools	21.3	1.3	46.3	91.3	16.3	2.4	16.1	5.0
Agriculture laboratory	7.5	0.0	5.0	0.0	20.0	0.0	67.5	100.0

IOSS = Irambo Original Secondary School.

SNSS = Shikula New Secondary School.

(ii) Degree of students' understanding of some Agricultural science topics

According to the Ministry of Education (URT, 1997) teaching agriculture in secondary schools should aim at ensuring that the learner is exposed to and taught the basic principles that are important in agricultural production in the country and involving learners in various practical projects that will help them develop the necessary skills and abilities required for agricultural production. Student respondents opinions were therefore sought on their degree of understanding of some agricultural subject topics as given in

Table 5. Results in Table 5 show that 58.5% and above of student respondents from both schools stated that crop and livestock production were easy, indicating these topics were not difficult to learn which implied a positive attitude towards the topics by students taking them. There is, therefore, a need for school management to maintain and improve the status quo by rewarding the students whenever they successfully conclude field projects or excell in agriculture examinations.

Table 5: Percentage distribution of student respondents' (n=160) opinions on degree of understanding for Agricultural science topics and type of school

Topics	Respondents' Degree of understanding									
	Easy		Average		Difficult		Very Difficult		Not covered	
	IOSS (n=80) %	SNSS (n=80) %	IOSS (n=80) %	SNSS (n=80) %	IOSS (n=80) %	SNSS (n=80) %	IOSS (n=80) %	SNSS (n=80) %	IOSS (n=80) %	SNSS (n=80) %
Fundamentals of Agriculture	43.8	48.8	42.5	48.8	7.5	0.0	1.3	1.3	5.0	1.3
Crop Production	72.5	61.3	26.3	33.8	0.0	5.0	0.0	0.0	1.3	0.0
Livestock production	58.8	68.8	25.0	27.5	1.3	3.8	1.3	0.0	13.8	0.0
Farming business economics and Agricultural extension	20.0	11.3	20.0	51.3	10.0	28.8	2.5	3.8	45.5	5.0
Soil and its Agricultural utilisation	46.3	26.3	26.3	37.5	7.5	30.0	0.0	3.8	20.0	2.5
Agriculture and environmental management	22.5	17.5	12.5	36.3	6.3	17.5	2.5	2.5	56.3	26.3
Agricultural Mechanics (Agro-mechanics)	17.5	17.5	6.3	8.8	23.8	10.0	42.5	61.3	10.0	2.5

IOSS = Irambo Original Secondary School.

SNSS= Shikula New Secondary School.

Results in Table 5 further show that agricultural mechanics (agro-mechanics) was rated as being very difficult by 42.5% and 61.3% of IOSS and SNSS student respondents, respectively. This implies negative attitude toward the topic. Thus, there is a need for the government to give adequate training to teachers who will consequently be competent in theory and practical aspects related to difficult topics like agromechanics.

(iii) Reasons for lack of students' understanding of some agricultural topics

It was expected that school context is depicted during certain avenues which can either lead to student understanding or not understanding of some topics and depend on how they are implemented. Student respondents' opinions were therefore sought on reasons for their lack of understanding of some agricultural topics as given in Table 6. Results in Table 6 show that 11.3% of the IOSS student respondents reported that they were simply not interested in those topics compared to only 5% from SNSS. This suggests that in both schools majority (above 50%) of students considered agriculture subject (optional) as seriously as they did in other subjects.

Table 6: Percentage distribution of student respondents' (n=160) opinions on their reasons for lack of understanding of agriculture topics by type of school

Reasons	Type of school	
	IOSS (n=80)	SNSS (n=80)
	%	%
Simply not interested in those topic areas	11.3	5.0
Ability to understand is low	15.0	17.5
Text books are not available	26.3	60.0
Text book are not enough	40.0	72.5
Other learning materials are not available	13.8	46.3
Very little practical work is done	5.0	45.0
No practical work done	11.3	28.8

I OSS = Irambo Original secondary school.

SNSS = Shikula New secondary School.

Furthermore, results in Table 6 show that about the same proportion (15% IOSS and 17% SNSS) of the respondents stated that the other reason was due to their low ability of understanding. This would imply that there is a need of having qualified teachers to improve the level of understanding of students through appropriate teaching and learning resources. On the other hand, students should be equipped with social skills to be able to prioritize their studies; and parents should offer conducive environment for teaching and learning. With regard to the remaining reasons related to text books, learning materials and practical aspects, IOSS seemed to be better compared to SNSS, although there is a need of improvement in both cases. Lack of essential materials for both theory and practical lead to students' lack of understanding of particular subject. The government and non-governmental organisations, therefore, need to help the schools to salvage this situation by providing adequate quality materials for practical teaching and learning of the skill-based agriculture topics.

(iv) Types and frequency of using teaching and learning resources in agriculture subject

Considering that methods employed by teachers to teach agricultural science subject in secondary schools are to a very large extent influenced by type of resources and facilities available in a particular school, student respondents' opinions were sought with regard to types and frequency of using teaching and learning resources in agriculture science subject, as given in Table 7. Results in Table 7 show that chalk and chalk board were most frequently used in both schools as stated by 76.5% and 82.5% of IOSS and SNSS respondents, respectively. It is also shown that a high proportion of respondents (60% and above) stated that school farm and teachers were most frequently used. On the other hand, laboratory, computers and visual aids were highly rated by more than 63.3% of the respondents as rarely used or never. These findings suggest that types and frequency of

using certain resources depend on their availability. Most of such resources (human and materials) for teaching and learning skill-based agriculture topics in the study schools were inadequate and in most cases unavailable for use.

Table 7: Percentage distribution of student respondents' (n=160) opinions on type and frequency of using teaching/learning resources in agricultural science subject by type of school

Type of teaching /learning resources	Types of school					
	Most frequent		Commonly		Rarely or never	
	IOSS (n=80) %	SNSS (n=80) %	IOSS (n=80) %	SNSS (n=80) %	IOSS (n=80) %	SNSS (n=80) %
Chalk and chalk board	76.3	82.5	23.8	17.5	0.0	0.0
School farm	66.3	62.5	31.3	36.3	2.5	1.3
Laboratory	7.5	0.0	18.8	0.0	73.8	100.0
Computers	3.8	3.8	30.0	0.0	66.3	96.3
Resources persons /teachers	60	66.2	5.0	33.8	35.0	0.0
Text books	8.8	11.3	47.5	78.8	43.8	10.0
Models	6.3	8.8	52.5	23.8	4.3	67.5
Visual aids	7.5	13.8	15.0	20.0	77.5	66.3

IOSS=Irambo Original secondary school.

SNSS = Shikula New secondary School.

In general, school-based factors affecting teaching and learning of agriculture science subject at IOSS and SNSS are multifaceted. There are those that are teacher centered and include teacher not being able to offer agriculture syllabus and not being consistent with class attendance. The other factors are related to lack of resources for effective teaching and learning to be realised. Besides that, there are factors associated with failure on the part of government to provide resources timely to meaningfully impact on teaching and learning. Poor social skills on part of learners is a factor which leads to poor time management, failure to handle negative peer pressure and ensuring that extracurricular activities and entertainment such as watching television do not impact negatively on their studies. The parent centred factors include lack of support and failure to provide

environment conducive for learning. There is, therefore, a need for the relevant authorities to give adequate training to teachers who consequently will be competent in theory and practical aspects; provide adequate quality materials for practical teaching and learning agriculture subject skilled topics; equip students with social skills to be able to prioritise their studies; and parents to offer an environment that is conducive for meaningful teaching and learning.

4.1.4 Students' opinions on non-school based factors affecting teaching and learning of agricultural science subject

Considering the greatest problem facing agriculture education in Tanzania is attitudinal yet most crucial to any education involving manual labour is favourable attitude, student respondents' opinions on non-school based factors that are encountered in teaching and learning agriculture in their schools were therefore sought, as given in Table 8. These are, in turn, discussed under three main parts namely: (i) practicing agriculture at home; (ii) hindrance of agricultural production at home; and (iii) hindrance of agricultural production at the locality.

(i) Practicing agriculture at home

It was assumed that due to minimal agricultural activities in urban, semi urban and arid areas the learners might not realise the importance of agriculture, student respondents were, therefore, asked whether they practice agriculture at home. Results in Table 8 show that the majority (91.2% from IOSS and 96.3% from SNSS) stated that they were practicing, and almost the same proportion with scale of operation from large scale to subsistence level. These findings reflect the Tanzanian situation in which small scale farmers whole family work hard, usually for very low returns.

Table 8: Percentage distribution of student respondents' (n=160) opinions on non-school based factors affecting teaching and learning of agricultural science subject by their type of school

Factors	Type of school	
	IOSS (n=80)	SNSS (n=80)
	%	%
Practicing agriculture at home		
Scale of operation	91.2	96.3
Large scale farming	5.5	14.3
Small scale farming	68.5	66.2
Subsistence only	26.0	19.5
Hindrance of agriculture production at home		
Lack of land and unreliable rainfall	26.8	33.3
Lack of economic power	71.4	66.7
Residing in urban areas	47.5	36.3
Agriculture is regarded as a hard manual labour	47.5	40.1
Hindrance of agriculture production at the locality		
Unreliable rainfall	32.5	42.5
Lack of interest of farming in the community	36.3	6.3
High levels of poverty	56.3	55.1
Over dependency on relief food from the government	8.8	2.5
Preference for white collar jobs in urban areas	11.3	2.5

IOSS=Irambo Original Secondary School

SNSS=Shikula New Secondary School

Further investigation revealed that students practicing agriculture after school unfortunately leaves them tired and unable to study at home. However, there is a great range in how successful they are – from large scale and successful farmers on one hand to those barely surviving (subsistence level). It was further noted from key informants that schools focus on preparing the youth for lives and job opportunities very different from the environment where they live. This indicates why parents would encourage the learners to opt for something different from what they do in their homes, which is diverting from agriculture, for them it appears not profitable occupation.

(ii) Hindrance of agriculture production at the home

It was assumed that students who took agriculture as an optional subject had interest in agriculture and wanted to pursue their career in agriculture. Student respondents were, therefore, asked on factors that hinder agriculture production at their home, as given in Table 8. Results in Table 8 show that the majority of the student respondents (71.4% from IOSS and 67.7% from SNSS) stated that the main reason was lack of economic power. It is possible that due to prevailing pre-dominantly low socio-economic status of the parents /guardians in the study area, in trying to empower the family, students spend time helping with farm activities after schools hours as indicated in item (i) of Table 8. Such practices would discourage students in their pursuit of agriculture education in the study schools, as such can be blamed for poor performance at school.

(iii) Hindrance of agriculture practice at locality

According to URT (2016) Agriculture sector in Tanzania continues to face decades-long challenges including poor access to low use of improved seeds and fertiliser; limited access to financing for adoption of modern technologies; unreliable rainfall in some regions poor prioritisation of marketing of produce and under investment by relevant authorities. Students respondents' opinion were, therefore, sought on factors hindering agricultural production in their locality, as given in Table 8. Results in Table 8 show that majority of the student respondents (56.3 from IOSS and 55.1% from SNSS) mentioned high levels of poverty, among other challenges. These results generally suggest that it is crucial for local authorities to focus on problems facing farmers always and address them, in order to improve low agricultural production. Studies (Borg and Gall, 2008) show that few students are willing to take up agriculture careers because of the formed attitude toward the subject. For example, many think that farm work is a menial job meant for "Never to do well" in the society. Parents therefore prefer their children to offer other

subjects rather than agriculture science subject. They do not think of their children having anything to do with the farm. Educated members of the society would willingly take up any available white collar jobs instead of agricultural jobs which is clearly regarded as “dirty job”.

In general considering that agriculture sectors is one of the key sectors of an economy in Tanzania which provides the basic needs of people food and a high proportion of people depend on it for their livelihood, there is a need for re-orientation of the poor attitude of society, especially youths, toward agriculture through government public enlightenment campaigns to see dignity in agricultural labour and the resuscitation of old farm settlement scheme given prevailing circumstances.

4.2 Teacher Respondents’ Characteristics and Their Opinions on Status, School Based Factors and Non-school Based Factors Affecting Teaching and Learning of Agricultural Science as an Optional Subject

4.2.1 Teacher respondents’ characteristics

Teacher respondents characteristics were those personal characteristics which were expected to influence teaching and learning of agricultural science subject at O’Level. Those investigated in this study involved: sex, age, marital status, level of education, professional training, specialization and length of tenure in school, as shown in Table 9. Examination of teacher respondents’ sex revealed that of the 20 respondents 10 were male and 10 were female (50% male and 50% female from each of the two study schools). Their age distribution was between 35 to 60 years. The majority (80%) from IOSS compared to and 40% from SNSS were in the range of 46-60 years. All of them were married, had attained the level of secondary education and had at least a diploma in education.

Table 9: Percentage distribution of teacher respondents' (n=20) characteristics by their type of school

Teachers' characteristics	Type of school	
	IOSS (n=10) %	SNSS (n=10) %
Sex		
Male	50.0	50.0
Female	50.0	50.0
Age categories		
35 – 45	20.0	60.0
46 – 60	80.0	40.0
Marital status		
Single	0.0	0.0
Married	100.0	100.0
Level of education		
Form IV	80.0	10.0
Form VI	20.0	90.0
Professional training		
Diploma	80.0	100.0
Degree	20.0	0.0
Specialisation		
General Agriculture	20.0	20.0
Other science subjects	80.0	80.0
Length of tenure in present school		
10 – 15	0.0	100.0
16 – 20	20.0	0.0
21 – 25	80.0	0.0

IOSS=Irambo Original Secondary School

SNSS=Shikula New Secondary School

The results in Table 9 further show that 20% of the teacher respondents specialized in agriculture were teaching agriculture as a major subject and their length of tenure ranged from 10 years and above. These results imply that agriculture science teaching force in the study schools was dominated by holders of diploma. This is not very surprising as diploma is the minimum professional qualification that one could possess to be qualified to teach O'Level in Tanzania. In relation to the minimum number of years in the teaching profession, it is shown that all the teacher respondents had taught for not less than 10 years, which could mean that they had acquired some level of experience. This suggests that when provided with needed teaching resources these teachers could deliver as expected due to having a bank of experience under their belt.

4.2.2 Status of teaching and learning of agricultural science subject

In order to establish the status of teaching and learning of agriculture sciences subject in the study schools, teacher respondents' opinions were sought, as given in Table 10. Results in Table 10 show that all (100%) teacher respondents agreed that agriculture science subject was offered as an optional subject, class size had more than 50 students and the highest qualification of agriculture teacher was a diploma. With regard to agriculture science subject being offered as an optional subject, it was confirmed from key informations that the Tanzania government policy towards agriculture science subject is that it was optional and not compulsory subject. This policy is rather surprising given the importance of agriculture in the country's economy. The curriculum developers and the Ministry of Education in Tanzania should therefore make agriculture science as core subject in secondary schools and reinforce the practical aspects of it more vigorously as skill subject for all without drawing dichotomy in the study subject.

Furthermore, according to the Ministry of Education in Tanzania (URT, 1995), the number of students per stream in O'Level is supposed to be 40 which means one teacher to 40 students (1:40). The results in the present study shown in Table 10 indicate that the average number of students in a stream was relatively high compared to the standard. This would be a problem if important resources such as teachers, teaching and learning materials and school infrastructure will not be increased. Hence it will negatively affect access to quality agriculture education because students will not be attentive as teaching is in progress.

Table 10: Percentage distribution of teacher respondents (n=20) opinions on status of teaching and learning of agriculture science as an optional subject by type of school

Statement	Type of school	
	IOSS (n=10)	SNSS (n=10)
	%	%
School offer agricultural science as an optional subject	100.0	100.0
Total number of students enrolled in each stream		
<40 students	0.0	0.0
40-50 students	0.0	0.0
>50 students	100.0	100.0
Qualification of agriculture teacher		
Diploma	100.0	100.0
Degree	0.0	0.0

IOSS = Irambo Original Secondary School

SNSS = Shikula New Secondary School

4.2.3 Teacher respondents' opinions on school based factors affecting teaching and learning of agricultural science subject

In order to ascertain school based factors affecting teaching and learning of agriculture subject, IOSS and SNSS teacher respondents' opinions were sought on (i) availability and adequacy of teaching and learning resources; and (ii) teaching methods.

(i) Availability and adequacy of teaching and learning resources

Teacher respondents (from IOSS and SNSS) opinions on availability and adequacy of teaching and learning resources were sought, as given in Table 11. Overall, results in Table 11 show that all (100%) of the teacher respondents from both the study schools stated that school farm was available and adequate. This was in agreement with students respondents (Table 4) whose majority (82.5% and above) had the same opinion on school farm. This implies that both the study schools had allocated enough land for agricultural activities. This is a strong factor that could have positively enhanced students perceptions

Table 11: Percentage distribution of teacher respondents' (n=20) opinions on adequacy of essential teaching and learning resources by type of school

Resources	Type of school							
	Adequate		Inadequate		Not in usable Condition		Not Available	
	IOSS (n=10) %	SNSS (n=10) %	IOSS (n=10) %	SNSS (n=10) %	IOSS (n=10) %	SNSS (n=10) %	IOSS (n=10) %	SNSS (n=10) %
Teachers	2.0	2.0	98.0	98.0	0.0	0.0	0.0	0.0
Textbooks	6.0	4.0	94.0	96.0	0.0	0.0	0.0	0.0
School farm	100.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Agriculture tools	20.0	20.0	80.0	80.0	0.0	0.0	0.0	0.0
Agriculture Rooms/Class	20.0	0.0	0.0	0.0	0.0	0.0	80.0	100.0
Computers	20.0	0.0	0.0	0.0	0.0	0.0	80.0	100.0
Livestock Units/Tools	20.0	10.0	0.0	20.0	80.0	0.0	0.0	70.0
Agriculture Laboratory	0.0	0.0	50.0	0.0	0.0	0.0	50.0	100.0

IOSS = Irambo Original Secondary School

SNSS= Shikula New Secondary School

towards agriculture subjects. Furthermore, it can be noted from results in Table 11 that school based factors that affect teaching and learning agriculture science subject are multifaceted, ranging from level of being available and inadequate to not being available. Further investigation from key informants revealed that there are those school based factors that are teacher centred and include teacher not being able to offer new syllabus and not consistent with class attendance. Other factors are related to lack of resources for effective teaching and learning to be released. Besides that there are factors which were associated with failure on part of the government to provide needed resources timely to meaningfully impact on teaching and learning. Poor social skills on part of learners is also a factor which lead to poor time management and failure to handle negative peer pressure. In addition, the parents centred factors include lack of support and failure to provide environment conducive for learning.

(ii) Teaching methods

Methods of teaching agriculture in school was also seen as an important factor in teaching and learning of agriculture science subject. Teacher respondents from IOSS and SNSS were, therefore, asked on the main methods they use in teaching and learning of agriculture subject, as given in Table 12. Results in Table 12 show that all (100%) teacher respondents from both the study schools used lecture method. The results are consonant with Ofoegbu (2015) who opines that in most cases agriculture science teachers are fond of using conventional methods, particularly the lecture method in teaching agriculture in secondary schools.

Table 12: Percentage distribution of Teacher respondents (n=20) opinions on methods used in Teaching and learning of agricultural science subject by type of school

Method	Type of school	
	IOSS (n=10) %	SNSS (n=10) %
Lecture	100.0	100.0
Practical	40.0	30.0
Demonstration	80.0	80.0
Group work	80.0	80.0
Assignments	90.0	90.0
Field visits	70.0	60.0
Projects	20.0	20.0

IOSS = Irambo Original Secondary School

SNSS= Shikula New Secondary School

The lecture method is criticized as ineffective as it turns the learners into passive participants in teaching and learning process, though it is useful in covering large content. This implies that the lecture method causes the teacher to dominate the teaching learning process with little participation on part of the learners. Thus, a more interactive method

such as demonstration method which has significant effect on students achievement compared to lecture method should be more frequently used in teaching and learning of agriculture science subject in secondary schools.

In general, instructional materials in the study schools for agricultural education are grossly inadequate. This makes the teaching and learning of agriculture science subject in secondary schools more of theory than practice. For the purpose of improving upon skill development appropriate requisite agricultural tools must be made available for teaching and learning. Moreover, there should be total re-orientation in methodology of teaching and learning of agriculture in the study schools, if students are to develop appropriate skills, interest, abilities and competencies for a vocation in agriculture. To this end, the use of humanistic approach in agriculture education throws a lot of challenges to the teacher. For example, the needs of the learner, interest development and ultimate success in school depend on guidance of the teacher who must display his professional expertise, knowledge and skill in handling agricultural education.

4.2.4 Teacher respondents opinions on non-school based factors affecting teaching and learning of agricultural science subject

Teacher respondents were asked on factors hindering agricultural production in their locality. All (100%) of the respondents from the study schools (IOSS and SNSS) perceived the agricultural practical teaching environment as constrained. The soils and climate around the school compound were unfavourable to support plant growth all the year around. The respondents stated that most of the farmers in the locality are smallholder farmers who are allocated in rural areas and mostly in former homesteads where lack of both physical and institutional infrastructure limit their expansion. Lack of access to poor roads, for example, limit ability of farmers to transport inputs, produce and

access to information. Infrastructure is very poor, markets for inputs and outputs are often missing and unreliable for smallholder farmers. These findings seem to suggest why the attitude of most Tanzanian youths towards agricultural education continues to be negative. The prestige and salary emphasis in the society have contributed towards worsening the attitudes of youth towards farm occupations. This implies that in order to change people's negative attitude toward agriculture political will, careful planning and desire to improve the country's development are matters that should be pursued in earnest.

In general, the teacher has great challenge in creating and maintaining conducive learning environment capable of facilitating student development to become useful to himself and the society in spite of any challenge with which he/she was admitted into class. Emphasis must be placed on the fact that students respond to teacher who is interested in them, who shows love and affection, appreciates and recognizes the importance of positive self worth and concept in any learning task. The agricultural sciences teacher should therefore function as a facilitator and helper who will lead the students to the desired destination.

4.3 Summary of the Findings

The overall objective of this study was to assess factors affecting teaching and learning of agricultural science as optional subject in selected secondary schools in Mbeya and Rungwe Regions, Tanzania. The study identified current status in teaching and learning agricultural subject being offered as an optional subject in the study schools. The school-based factors affecting teaching and learning of agricultural science as optional subject were found to be multifaceted, ranging from level of being available and adequate to not being available. In addition, non-school based factors affecting teaching and learning of agricultural science subject identified were soils and climate around school compound being unfavourable to support plant growth all the year around.

CHAPTER FIVE

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

- (i) Despite the importance of agriculture in the country's economy, Tanzania Government policy towards agriculture science subject is that it is optional and not compulsory.
- (ii) School based factors affecting teaching and learning of agriculture science subject are multifaceted. There are those that are teacher centred and include teacher not being able to offer agriculture syllabus and not being consistent with class attendance. The other factors are related to lack of resources for effective teaching and learning to be realised. Besides that there are factors associated with failure on part of government to provide resources timely to meaningfully impact on teaching and learning. In addition, learners and parents/guardians centred factors also affect teaching and learning of agriculture science subject.
- (iii) Since most of the farmers in the locality are smallholder farmers who are allocated in rural areas in former homesteads, where lack of both physical and institutional infrastructure limit their expansion, few students are willing to take up agriculture careers because of the informed attitude in the society toward agriculture subject.

5.2 Recommendations

- (i) There is a need for the government to have mechanisms in place to periodically review and evaluate policies related to taking agriculture as an optional subject in

order to ensure they are still relevant. The review process may highlight the need for amendment or even significant re-writing of the policies which would lead to making agriculture as a core subject in secondary schools in the country.

- (ii) There is a need for the relevant authorities to give adequate training to teachers who consequently will be competent in theory and practical aspects; provide adequate quality materials for practical teaching and learning agriculture subject skilled topics; equip students with social skills to be able to prioritise their studies; and parents/guardians to offer an environment that is conducive for meaningful teaching and learning.
- (iii) There is a need for re-orientation of poor attitude of society, especially youths, through government public enlightenment campaigns to see dignity in agricultural labour and the resuscitation of old farm scheme given prevailing circumstances.
- (iv) Suggestion for further research
 - (a) To undertake a case study on interaction between teacher and students in the study schools. The major purpose of this would be to elicit more reliable clues about communication behaviours between teachers and students during the process of theory and practical teaching.
 - (b) To undertake case studies on factors affecting teaching and learning of agriculture science subject in secondary school in other parts of the country in order to enable generalisation of observations. The purpose of the case studies would be to develop and enhance understanding of factors affecting teaching and learning agriculture subject.

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[EXTERNAL/TOPICS/EXTEDUCATION/0,contentMDK:20521252~menuPK:738179~pagePK:148956~piPK:216618~theSitePK:282386,00.html](http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTEDUCATION/0,contentMDK:20521252~menuPK:738179~pagePK:148956~piPK:216618~theSitePK:282386,00.html)]

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APPENDICES

Appendix 1: Operational definition of key variables

Variable	Operational definition
Age	Number of years lived since birth by an individual
Sex	Biological difference between male and female
Marital status	State where by an individual is either married, single, divorced, separated or widowed
Level of education	Number of years spent in formal schooling
Student variables	Student characteristics, school and classroom environment and location of the school and surrounding environment
Teacher variables	Teacher characteristics, teacher formative experience and Teacher preparedness
Process variables	Show interaction or interrelationship between teacher and student in classroom
Product variables	Associated with effect of teacher – student interaction

Appendix 2: Student's questionnaire

Confidential

Questionnaire: Personal interviews

Study topic: Factors affecting teaching and learning of Agricultural science as an optional subject in selected Secondary schools in Tanzania.

Region.....District.....

School..... (Before 2004 and

Continued 2006/Started 2006).

Respondents' number..... (Day/Boarding) Date.....

1.0 Students' characteristics

1.1 Personal characteristics

1.1.1 Sex..... (Male/Female)

1.1.2 Age:.....years

1.1.3 If form 1, 2, 3, or 4 taking Agriculture as an optional subject, indicate your area of subject specialization (Science/Arts) and any other optional subjects.....

1.2 Situational characteristics

1.2.1 Do you come from urban or rural areas?.....

1.2.2 What is the occupation of your parent/guardian?

1=Farmer

2=Employed

3=Business

2.0 Current status in teaching and learning of agricultural science subject

2.1 Why did you choose agriculture science and practice as an optional subject?

(a) Personal interest ()

(b) School policy ()

- (c) Parent’s influence ()
- (d) Teacher’s influence ()
- (e) Gender
- (f) Performance in Agriculture ()
- (g) Others (Specify).....

(a) Do you consider taking Agriculture oriented carrier after your secondary education?

Yes/No

(b) If Yes, indicate why?

c) If No, why?

3.0 School-based factors affecting and teaching and learning of agricultural science subject

3.1 How would you rate the adequacy of essential teaching resources in your school?

Please put a tick () where appropriate

Resources	Adequate	Inadequate	Not in usable condition	Not available
Teachers				
Text books				
School farm				
Agriculture tools				
Agriculture/rooms/class				
Computers				
Livestock units/tools				
Agriculture laboratory				
Others (Specify)				

3.2 For the agriculture topics given below, indicate the degree of your understanding for each of them by putting tick () in the appropriate column.

Topic	Easy	Average	Difficult	Very difficult	Not covered
Fundamentals of agriculture					
Crop production					
Livestock production					
Farming business economics and agricultural extension					
Soil and its agricultural utilization					
Agriculture and environmental management					
Agricultural mechanics (Agro-mechanics)					
Others (Specify)					

3.3 For the topics you very difficult of difficult in question 6 above, why do you find them so?

- (a) You are simply not interested in those topic areas ()
- (b) You ability to understand is low ()
- (c) Text books are not available ()
- (d) Text book are not enough ()
- (e) Other learning materials are not available ()
- (f) Very little practical work is done ()
- (g) No practical work done ()

3.4 The table below shows type and frequency of using teaching / learning resources in Agricultural science subject in your school. Appropriately.

Type of teaching/learning resources	Most frequent	Commonly	Rarely or never
Chalk and chalk board			
School farm			
Laboratory			
Computers			
Resource persons/Teachers			
Text books			
Models			
Visual aids			
Others (specify)			

4.0 Non-school based factors affect teaching and learning of agricultural science subject

4.1 Do you practice agriculture at home? Yes/No.

If yes How?

- (a) Large scale farming ()
- (b) Small scale farming ()
- (c) Subsistence only ()

If no why?

- (a) We have no land ()
- (b) Lack of economic power to purchase certified seed and inputs ()
- (c) We don't value agriculture at home ()

(d) I come from an urban area ()

4.2 What hinder proper agricultural practices in your locality?

(a) Unreliable rainfall ()

(b) Lack of interest of farming in the community ()

(c) High levels of poverty ()

(d) Over dependency on relief food from the government ()

(e) Preference for white collar jobs in urban areas ()

4.3 What hinders proper agricultural practices at home?

(a) Lack of land and unreliable rainfall ()

(b) Lack of economic power ()

(c) Residing in urban areas ()

(d) Agriculture is regarded as a hard manual labour ()

THANK YOU

Appendix 3: Teacher's questionnaire**Confidential****Questionnaire: Personal interviews**

Study topic: Factors affecting teaching and learning of agricultural science as an optional subject in selected secondary schools in Tanzania.

Region.....District.....School.....

(Before 2004 and continued 2006/Started 2006).

Respondents'.....Number.....

(Agriculture.....Subject teacher/others.....) Date.....

1.0 Teachers Personal Characteristics

1.1 Age..... (year)

1.2 Sex..... (male / female)

1.3 Marital status (Single/Married)

1.4 Level of formal education: (Tick) Final level and year obtained.

Formal education	Tick ()	Year
Form IV		
Form VI		

1.5 Professional Training: Complete as follows:

Level of Training	Final Qualification	Specialization	Graduation year
Certificate			
Diploma			
Degree			
Others (Specify)			

- 1.6 Length of tenure in Tanzania service(Years)
- 1.7 Length of tenure in the present school(Years)
- 1.8 Is agriculture your major teaching subject? Yes/No. if No, what other subjects are you teaching?.....
- 1.9 Work load per week.....(Number of periods)
- 2.0 Status in teaching and learning of agriculture science subject
- 2.1 Does your school offer Agriculture science as an optional subject? YES/No. If No explain.....
.....
- 2.2 What is the total number of students enrolment of agriculture class in each stream?.....
- 2.3 What is the qualification of agriculture teacher in your school?
 - (a) Degree in agriculture ()
 - (b) Degree in agriculture but no training as a teacher ()
 - (c) Diploma in agriculture education ()
 - (d) Diploma in agriculture with no training as a teacher ()
 - (e) Masters ()
 - (f) Any other (Specify).....
- 3.0 School Based factors affecting teaching and learning of Agricultural science subject
- 3.1 In your opinion what can be done to improve the teaching and learning of Agricultural science subject in your school?
.....
.....
- 3.2 How would you rate the adequacy of essential teaching resources in your school?
Please put a tick () where appropriate.

Resources	Adequate	Inadequate	Not in usable condition	Not available
Teachers				
Text books				
School farm				
Agriculture tools				
Agriculture rooms/class				
Computers				
Livestock unit/tools				
Agriculture laboratory				
Others (specify)				

3.3 Is Agriculture content relevant and practical to the level of learners? Yes/No. If No, which content do you find irrelevant and why?

.....

3.4 How is the coverage of Agriculture syllabus?

- (a) Good ()
- (b) Average ()
- (c) Poor ()

3.4.1 If the coverage of the syllabus is good which one of the following reasons accounts for this?

- (a) Teachers plan their work well ()
- (b) Students are fast in understanding ()
- (c) Availability of teaching learning resources ()

3.4.2 If the coverage of the syllabus is poor, which one of the following reasons account for this?

- (a) Teachers do not plan their work well ()
- (b) Students are slow in understanding ()
- (c) The syllabus is too wide for the time available ()
- (d) Classes are overcrowded ()
- (e) All the above ()

3.5 Which among the following methods of teaching is frequently used by Agriculture teachers in your school?

- (a) Lecture ()
- (b) Practical ()
- (c) Demonstrations ()
- (d) Group Work ()
- (e) Assignments ()
- (f) Field visits ()
- (g) Projects ()

3.6 To what extent is the agriculture syllabus relevant to the Tanzania situations?

- (a) Very relevant ()
- (b) Relevant ()
- (c) Less relevant ()
- (d) Not relevant at all ()

In any case, Why.....

4.0 Non-school based factors affect teaching and learning of Agricultural science subject

4.1 Briefly explain how teaching and learning of Agricultural science subject is affected by weather conditions.

.....

.....

THANK YOU

Appendix 4: Key informants’ checklist

Confidential

Checklist: Directed discussions

Study topic: Factors affecting teaching and learning of agricultural science as an optional subject in selected secondary schools in Tanzania.

HQS..... Region..... District.....

School.....

Respondents’ number..... Respondents’ Position held(e.g.

H/Mistress and District Secondary Education Officer (DSEO)

Date.....

1.0 Agriculture science is currently taught as an optional subject in some Tanzania secondary schools? Yes/No. If Yes,

why?.....

2.0 What is the qualification of agriculture in secondary Schools?

- (a) Degree in agriculture ()
- (b) Degree in agriculture but no training as a teacher ()
- (c) Diploma in agriculture education ()
- (d) Diploma in agriculture with no training as a teacher ()
- (e) Masters ()
- (f) Any other

(Specify).....
.....

3.0 What determine selection of agricultural science as an optional subject by students in schools?

- (a) Student interest ()

(b) Student performance ()

(c) Parents influence ()

(d) Teachers influence ()

(e) School policy ()

(f) Gender ()

(g) Others (specify).....

4.0 How would you rate the adequacy of essential agriculture subject teaching/Learning resources in secondary schools? Please put a tick () where appropriate.

Resources	Adequate	Inadequate	Not in usable condition	Not available
Teachers				
Text books				
School farm				
Agriculture tools				
Agriculture rooms/class				
Computers				
Livestock units/tools				
Agriculture Laboratory				
Others (Specify)				

THANK YOU