THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

CANDIDATES' ITEM RESPONSE ANALYSIS REPORT FOR THE CERTIFICATE OF SECONDARY EDUCATION EXAMINATION (CSEE) 2019

034 AGRICULTURAL SCIENCE

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FOREWORD

The Agricultural Science Candidates' Item Response Analysis Report on the Certificate of Secondary Education Examination (CSEE) 2019 has been prepared in order to provide feedback to students, teachers, parents, policy makers and other education stakeholders on the candidates' performance in this subject.

The CSEE marks the end of four years of secondary education. It is the summative evaluation which, among other things, shows the effectiveness of the education system in general and education delivery system in particular. Essentially, candidates' responses to the examination questions are strong indicators of what the education system was able or unable to offer to the students in their four years of secondary education.

The performance of the candidates in this year's examination is average. The report points out some reasons that caused the majority of the candidates who passed the examination to score low marks. This includes inadequate knowledge of the subject matter lack of field practical skills in the topics examined and misconceptions in the demands of the questions. Conversely, scoring of the high marks in the examination by some of the candidates is attributed to the possession of adequate knowledge and field practical skills in the topics examined which enabled them to address properly the demands of the questions. The report also provides recommendations on how to improve the performance of the candidates in future examinations administered by NECTA.

Finally, the Council would like to thank all the examinations officers, subject teachers and all others who participated in the preparation of this report.

Dr. Charles E. Msonde.
EXECUTIVE SECRETARY

1.0   INTRODUCTION

This report is based on the analysis of the candidates' item responses in CSEE in the Agricultural Science subject for the year 2019. The Agricultural Science examination was set according to the 2019 examination format which is based on the 1997 Agricultural Science syllabus.

The examination had two papers, 034/1 Agricultural Science 1 (theory paper) and 034/2 Agricultural Science 2 (practical paper). The theory paper consisted of sections A, B and C which carried the total 100 marks. Section A constituted two objective questions which are multiple choice and matching items. Question 1 consisted of ten items, each carrying 1 mark thus making a total of 10 marks for the question. Question 2 consisted of five items each caring 1 mark making a total of 5 marks for the question. Candidates were required to answer all the questions in this section. The section carried 15 marks. Section B comprised seven short answer questions each caring 10 marks making a total of 70 marks in this section. Candidates were required to answer all questions in this section. Section C had two essay type questions each caring 15 marks. Candidates were required to answer only one question. This section carried 15 marks.

The practical paper consisted of two short answer questions each weighing 25 marks making a total of 50 marks. The candidates were required to answer all the questions.

A total of 7,128 candidates sat for the subject examination this year out of which 4,592 (64.73%) passed and 2,502 (35.27%) failed. The general performance of the candidates in this year's examination was average with an increase of 11.79 percent pass compared to the 2018 results. The performance of the candidates by grades in CSEE 2019 is shown in Table 1.

Table 1: Candidates' Performance in Grades in CSEE 2019

Grades	A	B	C	D	F	Total
Boys	5	45	997	1,588	958	3,593
Girls	1	10	490	1,455	1,544	3,500
Total	6	56	1,487	3,043	2,502	7,094

Source: NECTA Statistics Book, page 8 CSEE, 2019

The next section presents an analysis of each question by presenting the demands of the questions, the candidate's responses and the reasons for their good or poor

performance in each question. Some samples of extracts showing candidates' good and poor responses have been included.

In analyzing candidates' performance in each question, the pass mark scale used was 0 – 29 (poor performance), 30 – 64 (average performance) and 65 - 100 (good performance). If the percentage of candidates who scored an average of 30 marks and above falls under certain stated ranges, the performance is described according to that particular group.

2.0   ANALYSIS OF CANDIDATES' PERFORMANCE IN EACH QUESTION IN 034/1-AGRICULTURAL SCIENCE 1

2.1 034/1- AGRICULTURAL SCIENCE 1

2.1.1 Question 1: Question 1: Multiple Choice Items

This question comprised ten items drawn from various topics in the Agricultural Science syllabus carrying a total of 10 marks. The candidates were required to choose the correct response from among the given five alternatives.

The question was attempted by 7,123 (99.3%) candidates, of whom 956 (13.4%) scored from 0 to 2 marks, 4,807 (67.5%) scored from 3 to 6 marks and 1,360 (19.1%) scored from 7 to 10 marks.

The general performance of the candidates in the question was good, since 6,167 (86.6%) candidates scored from 3 to 10 marks. Figure 1.1 shows the distribution of the candidates' scores in the question.
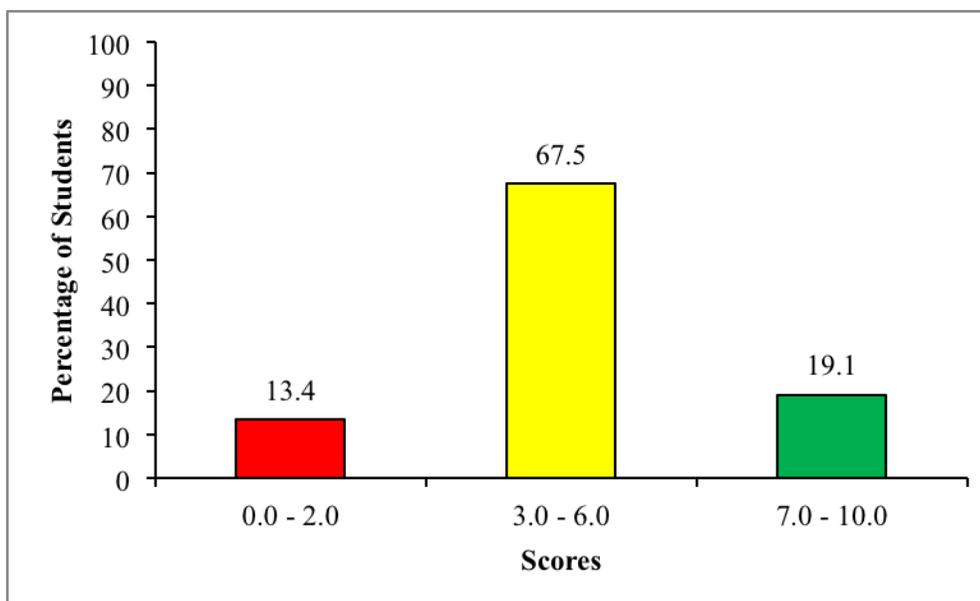
Figure 1.1: *Distribution of candidates' performance in question 1*

Figure 1.1 denotes the performance of the candidates in the question. The analysis of responses from the candidates revealed that most of the candidates provided correct responses to items (i), (ii), (iv), (vi), (viii) and (ix) and responded incorrectly to items (iii), (v), (vii) and (x). The analysis of candidates' responses in each item is as follows:

In item (i), the candidates were required to choose an option for the crops which belong to the grass family. A majority of the candidates chose the correct response which was C-*sorghum and paddy*. The distracters were: A, *cassava* and *sorghum*, B, *sorghum*, *beans* and *sweet potatoes*, D, *beans* and *paddy* and E, *beans* and *sweet potatoes*. In this item, the majority of the candidates showed a good understanding of crop classification. Other candidates opted for different distracters indicating poor knowledge of crops which belong to different classes.

In item (ii), the candidates were required to identify the statement that represents the meaning of plumbing. Most of the candidates chose the correct response which was E -*The cutting, threading and fitting pipes*. The distractors were; A, *connecting and joining timbers to make furniture*, B, *construction of various structures by using bricks or blocks*, C, *joining two*

pieces of metal by melting them together with a filler rod and D, *striking metal to form tools.* Provision of correct responses by the majority of the candidates signify good understanding of the meaning of the term plumbing. Some candidates who chose incorrect response lacked knowledge of the term plumbing.

In item (iii), the candidates were required to choose an option that differentiates mono-cropping and other systems of cropping. Majority of the candidates provided incorrect response such as A, *One annual crop is grown*. The incorrect responses were, B, *Different types of crops are grown on the same field in successive seasons or years*, C, *Two or more types of crops are grown on the field at the same time,* D, *One annual crop is grown on the field season after season or year after year* and E, *Different types of crops are grown on the field in a specific and systematic pattern*. Majority of the candidates opted for distracter D because they mixed up the meaning of mono-cropping and monoculture which is represented in distracter D. Some candidates who chose other incorrect responses lacked knowledge of cropping systems. However, a few of the candidates chose the correct response which was A, *one annual crop is grown.*

Item (iv) required the candidates to choose an alternative which shows how artificial insemination is done on farm animals. Most of the candidates demonstrated good mastery of animal breeding and livestock improvement by choosing the correct response which was D, *by depositing sperms at the appropriate part of the female reproductive tract*. The distracters were A, *by collecting sperms from the bull by artificial means*, B, *by extracting egg from the female and producing offspring artificially*, C, *by transplanting embryo to a cow which cannot conceive to produce offspring* and E, *by the fusion of egg and sperms to produce embryo artificially*. Some candidates were attracted to distracter E, which means artificial fertilization. The candidates had misconception on the meaning of artificial insemination. Other candidates chose other incorrect responses because they lacked knowledge and skills in artificial insemination.

In item (v), the candidates were required to choose the management practice which refers to replacement of dead trees in the field. The correct response was B, Beating up. Most of the candidates chose incorrect responses such as A *Thinning,* C *Pricking out,* D *Hardening off* and E *Pruning*. Most of the

candidates were attracted to the option E which refers to the removal of twigs or branches. All the distracters were forest management practices with different meanings. These candidates showed lack of knowledge and practical skills in various forest post management tending operations.

Item (vi) required the candidates to choose the management practice to be done to correct acidic soil so that it becomes suitable for growing agricultural crops and microbial activities. Majority of the candidates gave the correct response which is A *liming*. The incorrect responses were: B *salinisation*, C *alkalinisation*, D *acidification* and E *conversion*. Candidates' provision of correct response is an indication of possession of sufficient knowledge and practical skills in soil management practices. Few candidates who opted for incorrect responses showed to lack knowledge and skills on the subject matter.

In item (vii), the candidates were required to choose an alternative that identifies a good quality of the roughage feedstuff given to an animal. Majority of the candidates opted for incorrect responses such as A *Rich in crude protein,* B *High in fibre content and high in energy*, C *Rich in energy and protein* and D *Rich in protein and fibre content*. Majority of the candidates opted for B. The candidates were aware of the fibre content in roughages but uncertain their energy value. Provision of other incorrect responses by the candidates justifies lack of knowledge on the contents and energy value of the feedstuff. However, a few candidates managed to choose the correct response which is E *High in fibre content and low in energy.*

In item (viii), the candidates were required to choose the diseases which belong to the group of diseases which are caused by virus. Majority of the candidates provided correct response which was A *Rinderpest and rabies*. The distracters were: B *Anthrax and coccidiosis*, C *Blackquarter and Pneumonia*, D *Trypanosomiasis and East Coast Fever* and E *Anaplasmosis and brucellosis*. The ability of most of the candidates to provide correct response, suggests good understanding of the disease causative agents. The distracters contained mainly bacterial and protozoan diseases. As such, the incorrect responses chosen by some candidates, signifies poor understanding of the disease causative agents.

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The item (ix) required the candidate to choose the statement which is not the effect of poor waste disposal. Majority of the candidates chose the correct response which is E, *Reduces the costs of recycle materials*. The candidates demonstrated good understanding of the effects of poor waste disposal as they were able to choose the correct response. The incorrect options were A *Make the environment dirty*, B *Provide breeding group for diseases*, C *Pollute soil and water* and D *Waste can harm wild animals*. The incorrect responses chosen by some of the candidates were all the effects of poor waste disposal.

In item (x), the candidates were required to choose an option which shows an example of uncertainty in the farm. Most of the candidates chose incorrect responses such as A *Theft*, B *Fire outbreaks*, C *Accidents* and D *Health of the farmer and his family*. The candidates were attracted by different incorrect responses which were all risks. This is evidence that the candidates could not differentiate between risks and uncertainties in the farm. However, few candidates chose the correct alternative which was E *Price fluctuations*. These indicate good mastery of subject matter.

Question 2: Matching Items

The question consisted of five items composed from the topic of agricultural extension.

It was attempted by 7,120 (99.3%) candidates, out of whom 3,873 (54.4%) scored from 0 to 1 mark, 2,161(30.3%) scored from 2 to 3 marks and 1,086 (15.3%) scored from 4 to 5 marks.

The general performance in this question was average, as 3,247 (45.6%) candidates scored from 2 to 5 marks. Figure 1.2 illustrates the scores of the candidates in the question.
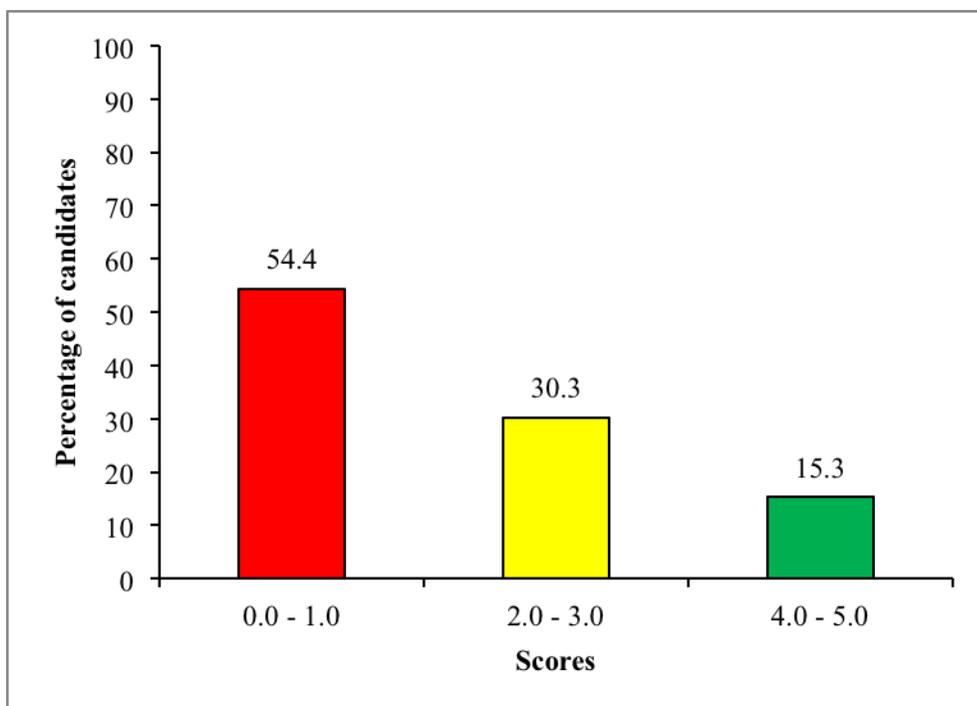
Figure 1.2: *Distributions of candidates' scores in question 2*

According to figure 1.2, the performance of the candidates in this question was average. It was observed in the analysis of the responses from the candidates that many of them provided correct response in items (iii), (iv) and (v). However, they responded incorrectly in items (i) and (ii). The analysis of candidates' responses in each item is as follows:

Item (i) required the candidates to match the statement "an individual gets a vague idea about innovation, but lacks enough information on that innovation" with the correct response. A majority of the candidates gave incorrect responses. Most of them were attracted to option G *Interest* which was incorrect. The candidates thought that after hearing about innovation, an individual wants more information about it so that he/she gets interested in the innovation. The incorrect responses given by the candidates indicates that they mixed up the meanings of the terms 'interest and awareness. Conversely few candidates gave correct response which was B *Awareness*. This is evidence that these candidates were knowledgeable in the subject matter.

The item (ii) required the candidate to match the statement "*An individual becomes desired in the innovation and looks for more information*" with the correct response. Most candidates failed to give the correct response. The correct response is *Interest*. Majority of the candidates opted for B, *Awareness*. The candidates had the wrong idea that when an individual hear about an innovation and looks more information on it that is where he/she becomes aware about that innovation. Failure to provide the correct response was caused by the misconception on the meaning of the statement.

In item (iii), the candidates were required to match the statement "An individual thinks about applying the ideas for his or her own situation" with the correct response. The correct response was F *Evaluation*. Most of the candidates gave the correct response implying that they had good understanding of the meaning of evaluation.

In item (iv), the candidates were required to match the statement "An individual attempts the innovation on small scale" with the correct response. The majority of the candidates provided the correct response which was A *Trial*. Provision of the correct response means good understanding of the meaning of the statement by the candidates.

The item (v) required the candidates to match the statement "An individual decides to use the innovation on a full scale" with the correct response. Most of the candidates managed to provide the correct response which was C *Adoption*. This signifies that the candidates possessed adequate knowledge of innovation adoption stages.

2.2   SECTION B: SHORT ANSWER QUESTIONS

2.2.1   Question 3: Production of crops

This question constituted five different field practices which were observed on agricultural fields in different crops. It carries a total of 10 marks. The candidates were required to identify the problem that can arise in each case.
Field 1- Tomato plants were irregularly watered.
Field 2- Organic manure was used on the soil growing carrot plants.
Field 3- More than one variety of sweet pepper were grown on the same
         piece of land at the same time.
Field 4- Nitrogenous fertilizer was applied on soils grown cassava plants.

Field 5- Sunflower crop plants were grown on a wet weather condition.

The question was attempted by 6,515 (90.4%) candidates, whereas 5,891 (90.4%) scored from 0 to 2 marks, 524 (8.1%)   scored from 3 to 6 marks and   100 (1.5%) scored from 7 to 10 marks.

The candidates performed poorly in this question since 5,891 (90.4%) candidates scored from 0 to 2 marks. Figure 1.3 represents the candidates' scores in the question.
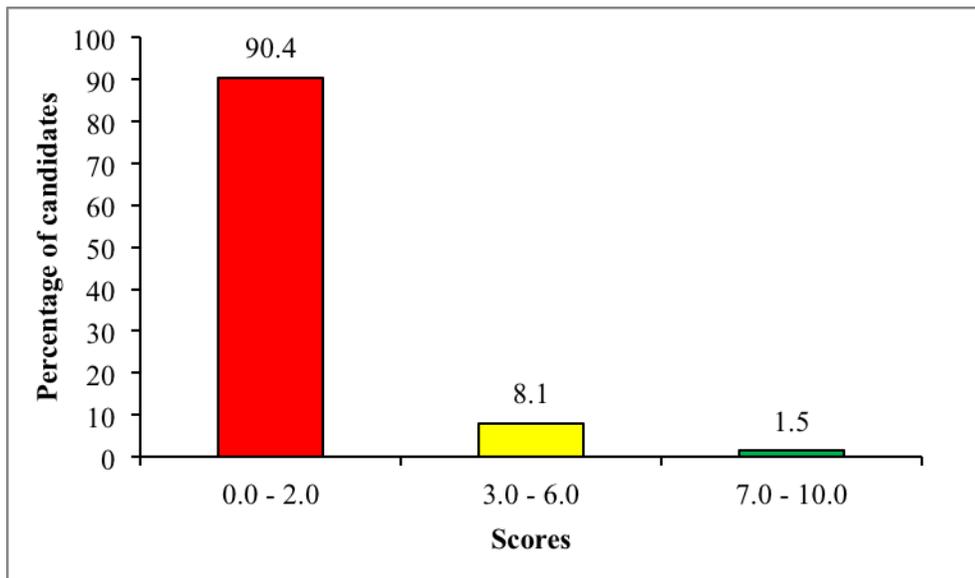

Figure 1.3: *Distribution of candidates' scores in question 3*

Figure 1.3 presents poor performance of the candidates. The candidates who performed poorly provided incorrect responses in fields 1, 2, 3 and 5.

In Field 1, the candidates failed to identify the problem that can arise when tomato plants are irregularly watered. Responses such as *Decompose of tomato plant, Loss of fertility* and *Tomatoes will be affected with parasites* were provided by the candidates.

Some of the incorrect responses regarding to the problem that would arise if organic manure is used on soil growing carrot plants on field 2 were; *Carrot plants died, increase in nutrient* and *will be formation of acidic soil.*

In field 3 for the problem that would arise if more than one varieties of sweet pepper were grown on the same piece of land at the same time, the candidates provided incorrect responses like: C*rop rotation problem, consider availability of water* and *there will be soil degradation, Tomatoes will be affected with parasites*.

Likewise, in Field 5, the candidates failed to identify the problem that can arise when sunflower crop plants are grown in wet weather condition. The candidates gave incorrect responses such as: *sunflower was falling down; sunflower will decay because of more moisture and there will be wilting of the plant due to presence of transpiration of plants*.

Provision of incorrect responses by the candidates is a proof that they lacked knowledge and skills on how tomatoes, carrots, sweet pepper and sunflower are grown well. Extract 1.1.1 represents poor responses to the question.

03.	The problbm that can arise in each case	
i/	Lack of soil fertility.	
ii/	Poor of soil moisture.	
iii/	Lack of soil pH in the plant.	
iv/	Increase of pest and disease.	
v/	Increase of weeds in the soil.	
vi/	Poor climate condition.	

Extract 1.1.1: *A sample of candidates' poor responses to question 3*

The extract presents poor candidate's responses. The candidate gave incorrect responses in all parts of the question. These incorrect responses indicate lack of knowledge in the principles of raising tomato, sweet pepper and sunflower.

Nevertheless, some candidates managed to identify the problem that can arise when nitrogenous fertilizers are applied on soil grown with cassava in Field 4. This shows that, the candidates had good understanding of conditions necessary for growing cassava.

Conversely, observations made from candidates who did well in the question showed that most of them correctly identified the problems that can arise in Field 1, 2 and 4.

In Field 1, the candidates provided correct responses for the problem that can arise when tomato plants were irregularly watered.

The candidates also managed to identify the problem that can arise when organic manure is used on soil growing carrot plants in Field 2.

Likewise, in Field 4, the candidates correctly provided the problem that can arise when nitrogenous fertilizers are applied on soils grown with cassava plants. This is an indication that the candidates were well knowledgeable and skilled in the production of tomato, carrot and cassava. Extract 1.1.2 is a sample of good responses from one of the candidates.

Extract 1.1.2: *A sample of candidates' good responses to question 3*

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The extract is a representative sample of good responses in the question in which the candidate provided correct responses in all parts of the question. This is an indication that the candidate was well knowledgeable and skilled in the production of tomato, carrot and cassava.

However, the candidates failed to provide correct responses with regard to the problems which can arise in Fields 3 and 5. In Field 3, the candidates failed to identify the problem that can arise when more than one variety of sweet pepper were grown on the same piece of land at the same time. Examples of incorrect responses provided were like: *not growing well, air pollution to different gases* and *monoculture*.

Similarly, most of the candidates were unable to identify the problem that can arise when sunflower crop plants grown in a wet weather condition in Field 5. The responses given by the candidates were such as: *flooding may occur, seeds get wet* and *diseases can occur.* The provided incorrect responses indicate that the candidates lacked knowledge and skills on how sweet pepper and sunflower can be grown well.

2.2.2   Question 4: Soil plant nutrients

The question had parts (a) and (b) carrying a total of 10 marks. The candidates were required to: (a) give five phosphorus deficiency symptoms that are expected to be seen on maize plants growing on the field with deficiency in it and   (b) give five roles of calcium in plants.

The question was attempted by 6,847 (95.5%) candidates where, 5,531 (80.8%) scored from 0 to 2 marks, 1,260 (18.4%) scored from 3 to 6 marks and 56 (0.8%) scored from 7 to 10 marks.

This indicates poor performance of the candidates since 5,531 (80.8%) candidates scored low marks from 0 to 2. Figure 1.4 shows the candidates' scores in the question.
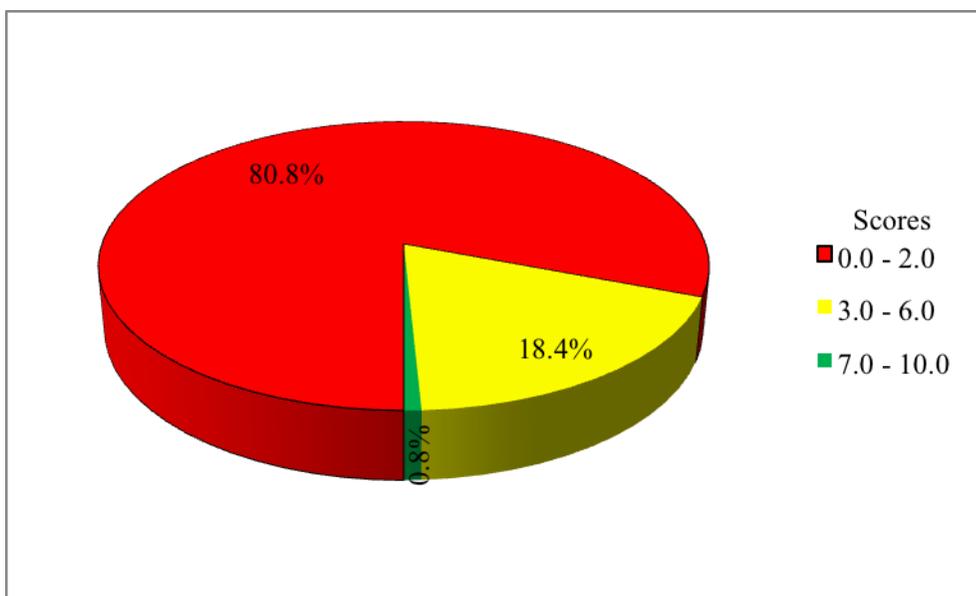
Figure 1.4: *Distribution of candidates' scores in question 4*

Figure 1.4 portrays poor performance of the candidates. The candidates, who performed poorly in the question, provided incorrect responses in almost all parts of the question.

In part (a), the candidates were unable to provide correct responses on the deficiency symptoms of phosphorus on crops of maize plants growing in soil with deficiency in the nutrient. Examples of incorrect responses provided were *burning leaves, lack of green colour* and *lack of soil fertility.*

Furthermore, in part (b) the incorrect responses for the roles of calcium to plants were *calcium help to improve soil productivity, calcium help the plant to grow faster* and *calcium help the plants to grow well in roots.* All these incorrect responses indicate lack of knowledge in plant nutrition. An example of poor responses provided by one of the candidates is shown in Extract 1.2.1.

4 a)- change in the colour of maize plant	
- increase in life Leaf defficiency.	
- low penetration of sunlight.	
- change in in growth of the maize plant	
- lack of chrolofill on the maize plant	
4 b) Roles of calcium in plants.	
-Help to support the plant growth by the action of reduce acidic soil to neutral or alkaline	
- To support the roots of the plant	
- It add more nutrient to the plant stems.	
- To increase the chrolofill to the plant	
- It adds more minerals to the plant.	

Extract 1.2.1: *A sample of candidates' poor responses to question 4*

The extract is a vivid example of responses from a candidate who lacked knowledge on plant nutrition. The candidate provided incorrect responses in both parts of the question. All these incorrect responses indicate lack of knowledge in plant nutrition.

However, few candidates in this group managed to give some few deficiency symptoms of phosphorus in part (a).

Contrarily, it was noted that the candidates who performed well in the question provided correct responses to almost all parts of the question.

In part (a), the candidates managed to provide deficiency symptoms of phosphorus expected to be seen in the crop of maize plant grown in an area with deficiency in the nutrients.

Moreover, in part (b) the candidates were also able to give the roles of calcium in plants. This signifies that the candidates had adequate knowledge

of plant nutrition. However, some candidates did not exhaust all the deficiencies in phosphorus and role of calcium in plants. An example of good responses to the question is shown in extract 1.2.2.

Extract 1.2.2: *A sample of candidates' good responses to question 4*

The extract presents good responses from a candidate who managed to provide correct responses in both parts of the question. This signifies that the candidate had adequate knowledge in plant nutrition.

2.2.3 Question 5: Dairy cattle farming

The question had parts (a) and (b) carrying a total of 10 marks. The candidates were required to: (a) suggest six features required for a good house for the Friesian cattle and (b) advice the farmers on proper diseases and parasites control measures to be taken.

The question was attempted by 7,027 (98%) candidates, of whom 3,145 (44.5%) scored from 0 to 2.5 marks, 3,041 (43.2%) scored from 3 to 6 marks and 841 (12%) scored from 6.5 to 10 marks.

The general performance of the candidates in the question was average since 3,882 (55.2%) candidates scored from 3 to 10 marks. Figure 1.5 presents the candidates' scores in the question.

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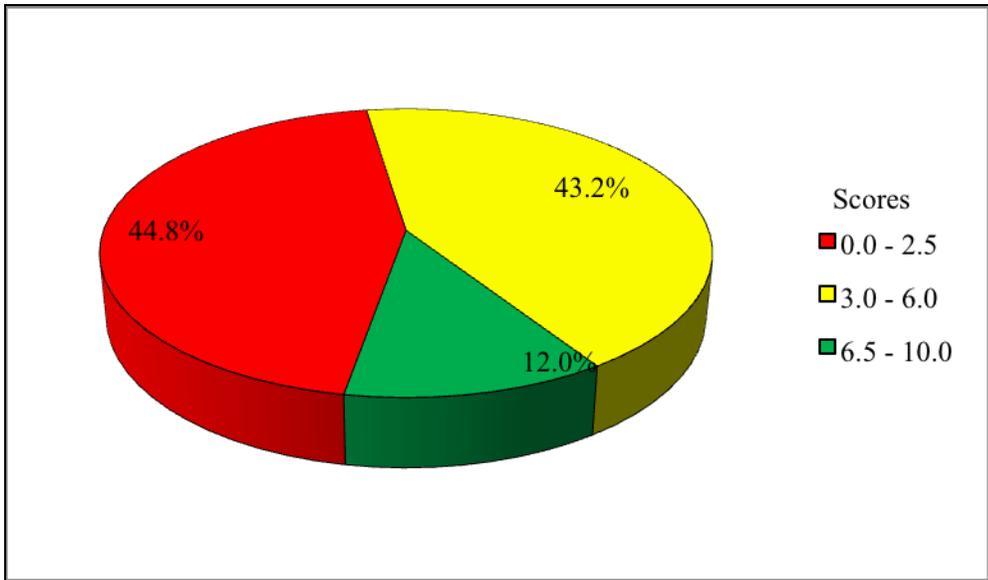
Figure 1.5: *Distribution of candidates' scores in question 5*

According to Figure 1.5, the candidates' performance in this question was average. The candidates who performed well in this question responded correctly to almost all parts of the question.

In part (a), most of the candidates managed to suggest good features required for the house of Friesian cattle.

In part (b), the candidates provided most of the correct responses for the measures to be taken to control livestock diseases and parasites. This suggests that the candidates were well acquainted with the subject matter on dairy cattle management.

However, some candidates were unable to provide all the good features required in a dairy cattle house in part (a). Extract 1.3.1 is a representative sample of good responses to the question.

5. (a) Features required to build a suitable house of the cattle
(i) Strong roof for protection against rain and sunlight.
(ii) Strong walls for protection against predators and thieves
(iii) It should have a foot bath
(iv) It should also have large window for proper ventilation.
(v) It should also have water and feed trough
(vi) It should also has special facilities for cattle during practice such as milking, dipping and spraying.

(b) Proper measures to control diseases and parasites in the farm are
(i) Good hygiene
In order to control disease and parasites a farmer should observe good hygiene in his/her farm.

(ii) Provision of foot bath at the door of the animal house.
This helps to disinfect animals before entering into their houses.

(iii) Use of drugs and vaccines
Also a farmer should also use drugs and vaccines to treat or to cure and to prevent certain diseases and also to destroy parasites.

(iv) Uses of dips with suitable accaracides
Also special facilities called dips should be used in order to control external parasites of the animals.

Extract 1.3.1: *A sample of candidates' good responses to question 5*

The extract is an example of responses from one of the candidate who performed well in all parts of the question. This shows that the candidate were well acquainted with the subject matter on dairy cattle management

On the contrary, the candidates with poor performance in the question failed to provide correct responses to almost all parts of the question.

In part (a), the candidates failed to suggest good features required for a house of dairy cattle. Examples of incorrect responses provided were: *far from people farm since they can eat the crops, It should have large or have fence so as to provide environment for Friesian to get some exercises and it should be the area which allow it from mating since they have high productivity.* Other candidates provided characteristic features of good dairy cattle instead of good features for a house of dairy cattle.

In part (b), the candidates failed to advise farmers on measures to be taken to control livestock diseases and parasites. The candidates gave incorrect responses such as *by using pesticides- this would help to reduce the pest and parasites in the farm and leaving the crops with no effects, good government support and low level of science and technology.* Incorrect responses given by the candidates imply that the candidates lacked knowledge and field practical exposure on dairy cattle management. Extract 1.3.2 is a sample of responses from a candidate who performed poorly in the question.

05 a features required to build the house for the cattle
* should be near homestead
* should not supposed to be near by the source of water.
* should not supposed to be near by the farm to avoiding the destroyed of the crops which cause by the cattle.
* should supposed to be divided the place of the keeping of the grass or food in order to avoiding the dirtness to range/the house of the cattle.
* Should supposed to keep the bulb so that to produce the light inside the cattle house

b. Used a pesticide disease which used to kill pest.
Used a harbacides ds. which used to kill weeds.
Used insecticides which used to kill insects.
Used harrowing which used to remove weeds in a field

Extract 1.3.2: *A sample of candidates' poor responses to question 5*

The extract portrays poor responses in the question. The candidate provided incorrect responses in all parts of the question. Incorrect responses given by the candidate imply that the candidates lacked knowledge and field practical exposure on dairy cattle management.

A few candidates who performed poorly in the question were able to give advice to farmers on measures to be taken so as to control livestock diseases and parasites in part (b).

Question 6: Agricultural mechanization

The question had parts (a) and (b) carrying a total of 10 marks. The candidates were required to: (a) give six reasons to support the advice from an extension officer that farmers should change their ways of doing farm operations from human power to mechanical assistance and (b) account for four factors that limit the effectiveness farm mechanization in agricultural production.

The question was attempted by 6,917 (96.4%) candidates, whereby 2,563 (37.1%) scored from 0 to 2.5 marks, 2,981 (40%) scored from 3 to 6 marks and 1,373 (22.9%) scored from 6.5 to 10 marks.

The candidates' performance in the question was average in which 4,354 (62.9%) candidates scored from 3 to 10 marks. Candidates' scores in the question are shown in Figure 1.6.
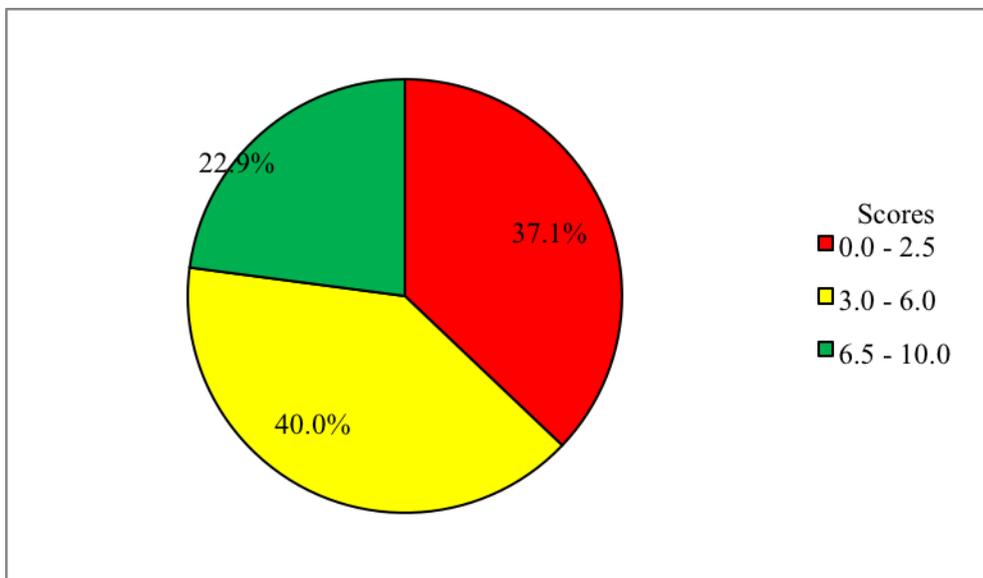
Figure 1.6: *Distribution of candidates' scores in question 6*

Figure 1.6 indicates average performance of the candidates in the question. Most of the candidates who performed well in the question were observed to have provided correct responses to almost all parts of the question.

In part (a), the candidates gave correct reasons to support the advice given by the extension officer to farmers on the importance of changing their ways

of doing farm operations from the use of human power to mechanical assistance.

In part (b), the candidates also managed to account for the factors that limit the effectiveness of farm mechanization in agricultural production. Provision of correct responses by most of the candidates is attributed to possession of enough knowledge of advantages and limitations in mechanization of farm operations. Examples of good responses to the question are shown in extract 1.4.1.

6. (a) An extension officer advised farmers to use mechanical assistance and leave human power because mechanical assistance has the following importances over human power.

(i) It saves time used in agricultural activities, compared to human power which uses a lot of time

(ii) It simplifies works in the farm. Through mechanical assistance works in the farm are made easy.

(iii) It requires less labour in agricultural activities, Only few people can be employed to run various agricultural activities using machines.

(iv) It increases productivity in the farm. When mechanical assistance is used instead of human labour, it facilitates high productivity.

(v) The use of mechanical assistance does not affected by weather condition unlike the use of human labour. Therefore agricultural activities in the farm can be done all the time

(vi) It reduces drudgery involved in hard and dirty works to the farm. Hard and dirty activities in a farm like dealing with animal manures are done by machine instead of human beings.

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6.	(b) Factors that limit the effectiveness of farm mechanization in agricultural production are	
	(i) Technical Factors	
	This is lack of skills in using machines in agriculture and also it involves poor technology which leads to inability to development machines.	
	(ii) Biological factors	
	This involves various infections and diseases caused by parasites in agriculture	
	(iii) Topographical factor	
	This involves or means the way the land used for agriculture is. Agricultural mechanization is limited in areas with steep slopes and hills.	
	(iv) Financial factors	
	This factor affects the mechanization in agriculture due to lack of enough capital among the farmers to buy and maintain various machines needed for agricultural activities.	

Extract 1.4.1: *A sample of candidates' good responses to question 6*

The extract indicates one of the candidates' good responses to the question. The candidate showed good mastery of knowledge in agricultural mechanization by providing correct responses in both parts of the question.
On the contrary, the candidates who did poorly in the question, failed to provide correct responses to almost all parts of the question.

In part (a), the candidates gave incorrect reasons to support the advice given by the extension officer to farmers on the importance of changing their way of doing farm operations from the use of human power to mechanical assistance. Examples of such responses were: *because human power need a lot of power, mechanical assistance can be used in all areas like in plain*

and *in steep slope and mechanical assistance does not be attacked by diseases.*

Failure to give the advantages of mechanization in part (a) also caused the candidates to fail to give its limitations in part (b). Examples of incorrect responses from some of the candidates were: *it is cheap to operate, need more power* and *takes time to use.* This is evidence that the candidates lacked an understanding of advantages and limitations of the use of machines in farm operations. Extract 1.4.2 represents poor responses from one of the candidates.

6 (a) An extension officer advised Farmers to change their ways of doing farm operations from human power to mechanical assistance. Give six reasons to support the advice given by the extension officer.

(i) Change the Price means that people to Support in the extension officer to change the Price it the very importante it provide the raw matsiral and take the money in another Country.

(ii) Change the demand means that the people to support the extension officer to change to demand the People because people to increase the demand the high demand.

(iii) Change they Fluctuation Price means that People is not to get Demand head because the market the Trops to Fluctuation Price because People is not buy in Trops because The change of Fluttuation Price.

(iv) Change of the Marketing means that the Extension officer is not very go nt good because the marketing is not trade because the People to go a trade is very increase the Trops is very increas the one

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6 (a) Trops to increase the Marketing because the Change to marketing.

(v) Change the Electrical Clonate in the Marketing means that the Change the marketing to Change in Clonate because trops is not by buy because the Change the Marketing of the Clonate because People is not go a marketing to by buy the Trops seed because Change on Clonate.

(vi) Change the of the money because the People people to Support Methanic anucal assistance because people to Produce to another Trops to taken the now money because to Support the People to get the new Tapital or the new money.

6 (b) Attount For Tattors that limit the Effectiveness of Farm mechanization on Agricultural Production use four Point.

(i) To Produce the another Trops.

(ii) To Produce the raw material.

(iii) It help to Produce the maize

(iv) To Produce Production of raw Trops on the Farm

Extract 1.4.2: *A sample of candidates' poor responses to question 6*

The extract 1.4.2 shows a sample of the candidates' poor responses to the question. Lack of knowledge on advantages and disadvantages of mechanization in farm operations caused the candidate to provide incorrect responses to all parts of the question.

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Although the majority of the candidates provided incorrect responses to almost all parts of the question some of them gave few correct advantages of mechanization in part (a).

Question 7: Farm records and accounts

The question required the candidates to calculate gross margin per hectare of maize using the data given. It carried 10 marks.

The question was attempted by 5,836 (81.4%) candidates, of whom 2,239 (38.4%) scored from 0 to 2.5 marks, 2,172 (37.2%) scored from 3 to 6 marks and 1,425 (24.4%) scored from 6.5 to 10 marks.

The general performance of the candidates in this question was average because 3,597 (61.6%) candidates scored from 3 to 10 marks. Figure 1.7 shows the distribution of the candidates' scores in the question.
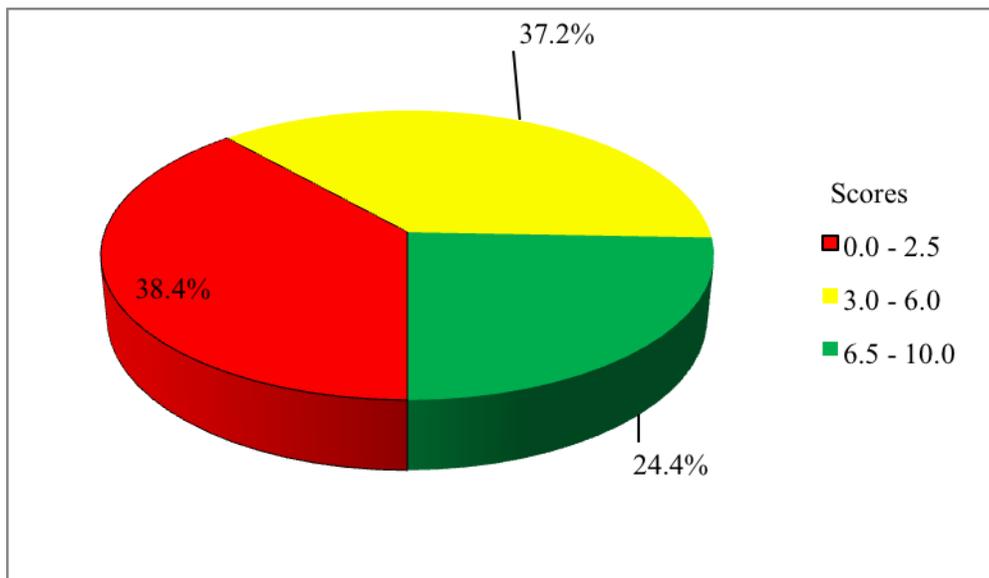

Figure 1.7: *Distribution of candidates' scores in question 7*

Figure 1.7 suggests that the performance of the candidates in the question was average.

Despite the average performance of the candidate in this question, some of the candidates did well. Those who did well used the correct formula to calculate the gross margin in which they estimated correctly the output and the variable costs.

Furthermore, the candidates correctly plugged the values of output and variable costs into the formula and showed good mathematical manipulation skills to get the correct value of the gross margin per hectare of maize. This is an indication that the candidates had enough knowledge in gross margin analysis calculations. A sample of good responses in the question is illustrated in Extract 1.5.1.

Qn 7	Given: Maize was planted 2 hectares
	Total yields = 60 bags of 100kg = 6000kg
	but selling price per kg = 500 Tsh.
	Therefore Output = 6000kg X 500Tsh
	Output = 3,000,000
	Variable
	fertilizer 460,000
	Seeds 120,000
	Insecticide 20,000
	weeding cost 80,000
	harvesting cost 200,000
	Variable cost = 880,000
	from Gross Margin = $\dfrac{Output - Variable\ cost}{Number\ of\ hectare}$
	Gross margin = $\dfrac{3,000,000 - 880,000}{2}$
	Gross margin = 1,060,000

Extract 1.5.1: *A sample of candidates' good responses to question 7*

The extract is a sample of good responses in the question in which the candidate used correct formula and showed good mathematical manipulation skills in calculating gross margin per hectare of maize.

Likewise, candidates who performed poorly in this question failed to calculate gross margin per hectare of maize. Most of the candidates used incorrect formulae and procedures to compute the gross margin. Some of the incorrect formulae used by the candidates were like *gross margin* $= \dfrac{Land\ in\ area}{Chemical\ speed}$, *gross margin* $= \dfrac{c-s}{N}$, *gross margin* $= \dfrac{b_1 - b_2}{b_1}$. This group of candidates lacked knowledge in the subject matter on gross margin analysis calculations. Extract 1.5.2 is a sample response by a candidate who performed poorly in the question.

07					
	Valuation of the farmer products on farm Purchaser		harvesting cost 200,000 weeding cost 80,000	280,000	
	Seeds 120,000 fertiser 460,000 herbicide 20,000	600,000	Valuation of the farm expenses and outcome	2	
	Expenses Yield bags 6000 Maize 500	6,500 60 6500 326,500		326,500	
	∴ The gross margin per hectare is 326,500 Tshs.				

Extract 1.5: *A sample of candidates' poor responses to question 7*

The extract illustrates a sample of responses from the candidate who responded incorrectly to the whole question due to lack of knowledge in gross margin analysis.

Question 8: Agricultural science laboratory

The question had parts (a) and (b) carrying a total of 10 marks. The candidates were required to: (a) give brief description of how to render first aid to a student who has been injured by a knife with severe bleeding and (b)

outline any other four accidents that are likely to occur in an agricultural science laboratory.

The question was attempted by 6,941 (96.8%) candidates, whereas 3,930 (56.6%) scored from 0 to 2.5 marks, 3,004 (43.3%) scored from 3 to 6 marks and only 7 (0.1%) scored from 6.5 to 8 marks.

The general performance by the candidates in the question was average as 3,011 (43.4%) candidates scored from 3 to 8 marks. Figure 1.8 represents the candidates' scores in the question.
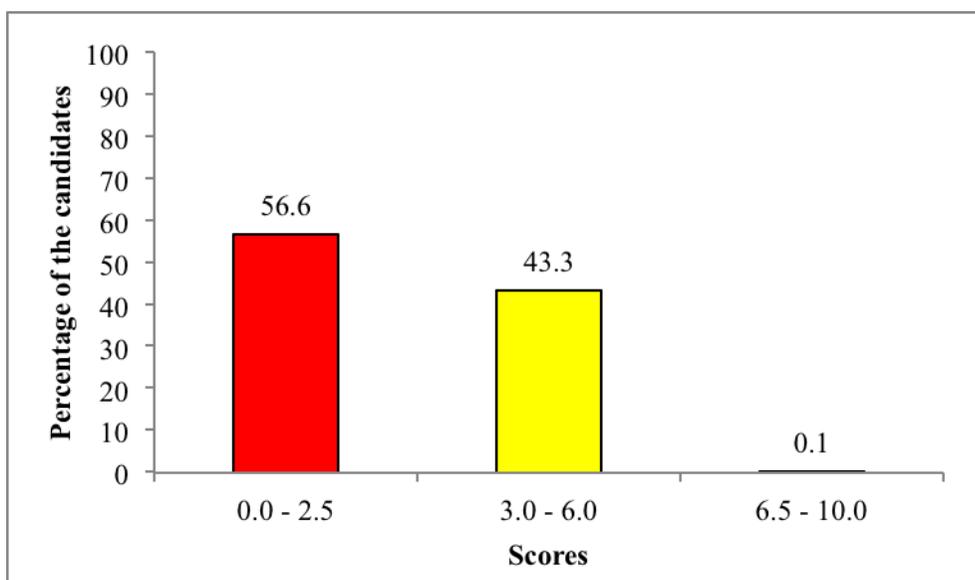
Figure 1.8: *Distributions of candidates' scores in question 8*

According to figure 1.8, the candidate's performance in the question was average.

In part (a), the candidates correctly described how to render first aid to a student who has been injured with a knife and bleeds severely.

In part (b), the candidates also outlined correctly other accidents which can occur in a laboratory. This indicates that the candidates were knowledgeable enough and well skilled on how to render first aid to injured persons or victims of accidents in the laboratory. Extract 1.6.1 represents one of the good responses to the question.

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8 (a). The following are the procedure to help some one who have an injured

i/ lay the person down and lose the tighting's clothes

ii/ Supres with the finger the place where they bleeding an until the blood stop

iii/ Wash the wound by using clean clothes

iv/ Applying the iodine ticture to the wound/sipind

v/ Cover the wound by using bandage.

vi/ If the wound is large take it to the medical Care.

8 (b), i/ fainting

ii/ fire outbreak,

iii/ Shock.

iv/ vomiting

Extract 1.6.1: *A sample of candidates' good responses to question 8*

The extract shows a sample of responses from a candidate who did well in the question. The candidate to a great extent managed to describe how to render first aid to a student who has been injured and bleeds severely in part (a). In part (b), the candidates outlined correctly other accidents which can occur in a laboratory.

Conversely, candidates with poor performance either failed to meet the demands of the question where they described how to render first aid to a person who has been injured and have normal wound from small cut instead of one who bleeds severely as a result of the big cut. They gave incorrect responses indicating lack of subject matter contents.

Some of the incorrect responses in part (a) given by the candidates were: *wash the wound with salt, apply iodine tincture on the wound, apply spirit on the wound, apply paper on the wound, tie the upper part to avoid poison*

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spread, give the victim pain killer to reduce the pain, give the victim some fruits and protein food to return back blood, provide the victim with drinking water and *apply local medicine on the wound.*

In part (b), the candidates were also unable to outline any other four accidents that are likely to occur in the agricultural science laboratory as they gave incorrect responses like: *wounds caused by agricultural equipment such as hoe and axe, dehydration caused by bad weather, pests and diseases* and *injuries caused by a car.* The responses given by the candidates indicate that they lacked sufficient knowledge in safety in the laboratory. Extract 1.6.2 is one of the candidates' poor responses in the question.

Extract 1.6.2: *A sample of candidates' poor responses to question 8*

The extract presents a sample of the candidates' poor responses to the question. In part (a), candidates had fragmented ideas which did not describe the correct procedure for rendering first aid.

Question 9: Soil and Water Conservation

The question comprised parts (a) and (b) carrying a total of 10 marks. The candidates were required to: (a) advise people in the community by providing seven points on the importance of trees in soil and water conservation and (b) explan in three points the importance of soil and water conservation.

The question was attempted by 7,078 (98.7%) candidates, of whom 2.852 (40.3%) scored from 0 to 2.5 marks, 3,421 (48.3%) scored from 3 to 6 marks and 805 (11.4%) scored from 6.5 to 10 marks.

The performance of the candidates in the question was average, with 4,226 (59.7%) candidates scored from 3 to 10 marks. Figure 1.9 indicates the candidates' scores in the question.
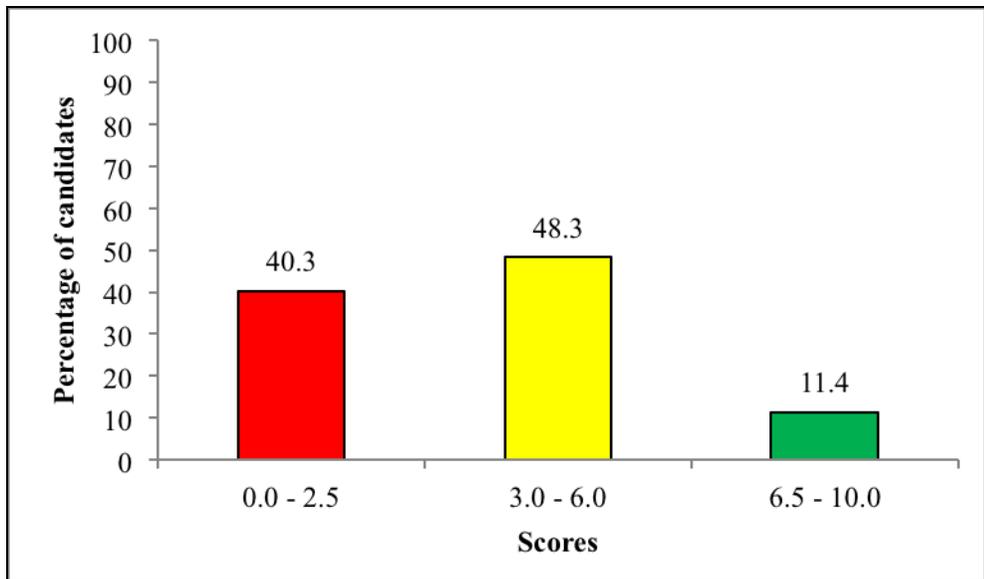
Figure 1.9: *Distribution of candidates' scores in question 9*

Figure 1.9 illustrates an average performance of the candidates in the question. Despite the average performance in this question, some candidates performed well by providing the correct responses in almost all parts of the question demonstrating adequate knowledge on soil and water conservation. In part (a), the candidates gave correct advice to the community on the importance of trees in soil and water conservation. The candidates also managed to explain the importance of soil and water conservation in general in part (b). Extract 1.7.1 is a sample of good responses to the question from one of the candidates.

9@(i) Trees provide shade which prevent the loss of moisture to the soil.

(ii) Trees reduce the rate of evaporation to the water, hence transpiration is applied.

(iii) Trees add soil fertility which leads into high production of crops.

(iv) Trees adds volume to the water bodies like river. This is due to stream which are obtained from different trees.

(v) Trees prevent the occurance of soil erosion.

(vi) Trees help to produce leaves which are used as mulching in the farm.

(vii) Trees help to reduce the speed of water when this

9@(vii)	in high speed.	
(b)(i)	The conservation of water help to stimulate high irrigation scheme. This is caused by high presence of water sources and there well preservation.	
(ii)	The conservation of the soil help to produce high rate of crops due to the presence of fertility which is right proportion to the growth of the plant.	
(iii)	The Preservation of water helps in the production of hydroelectric power. The production of this power is due to the high amount of power to a place as well as well preservation.	

Extract 1.7.1: *A sample of candidates' good responses in question 9*

The extract is a sample of good responses from a candidate who did well in the question. The candidate provided correct responses to all parts of the question, showing good mastery of knowledge in soil and water conservation.

Conversely, the analysis of responses from the candidates who performed poorly in the question indicated that most of them responded incorrectly in almost all parts of the question

In part (a), the candidates gave incorrect advice to the community on the importance of trees in soil and water conservation by writing: *it help to provide employment opportunities, some trees are medicine for treating people* and *livestock, people should stop deforestation and people should use proper methods of farming.*

Likewise, in part (b) the candidates gave incorrect explanation on the importance of soil and water conservation in general. They wrote responses such as: *to help understanding of crop rotation, to help understand employment, help to understand living organisms in the environment* and *it used for food* were provided by the candidates. The incorrect responses provided by candidates signify poor understanding on soil and water conservation. Extract 1.7.2 is a sample of poor responses to the question.

9ᵃ) -to provide food: importance of trees is Soil and water to provid food comes of how Sail to plant food exampale flant, vegatation and anathe plant So Soil and water to provid food

-to provide oxygen: for this point to show trees to provide oxygen In aftemoon So Soil and felotus Is Very Importane of oxygen for athe organisms

-Habitated for living organisms: and for this to See trees in Soil and coter Impotane for conservation is ges to produe this Habitated for living organismt Some organi sms to Used this trees and after palant Go Habitat

-Change Soil of the land and former: and to Show tree to Chang Soil of land and Famer because to to pluining (mujan) Change Soil Is the very Importane of trees on the Soil and water

-It provid organism matter: for this point Is theverug Stoy point trees te Elf to cativat to produce Some organi m matter

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9 b)-Increasing of biodiversity : this point to show area production For this cord biodiversity For the Soil and water conservation	
-Spread of diseases decreased : for this poi nt to Show Spread of diseases of the decre ased conservation	
- It encourage development of Agriculture activities to Show development of Agricul ture activities Soil and water Used for agriculture activities	

Extract 1.7.2: *A sample of candidates' poor responses to question 9*

The extract is a sample of responses from a candidate who performed poorly in all parts of the question showing lack of knowledge in soil and water conservation.

2.3   SECTION C: ESSAY TYPE QUESTIONS

2.3.1 Question 10: Livestock health and diseases

The question was an essay type carrying a total 15 marks. The candidates were required to use six points to advise farmers on how to detect a sick animal.

The question was opted by 1,252 (17.5%) candidates, out of whom 752 (60.1%) scored from 0 to 4 marks, 270 (21.5%) scored from 4.5 to 9.5 marks and 230 (18.4%) scored from 10 to 15 marks.

The performance of the candidates in the question was average, since 500 (39.9%) scored from 4.5 to 15 marks. Figure 1.10 shows the distribution of the candidates' scores in the question.
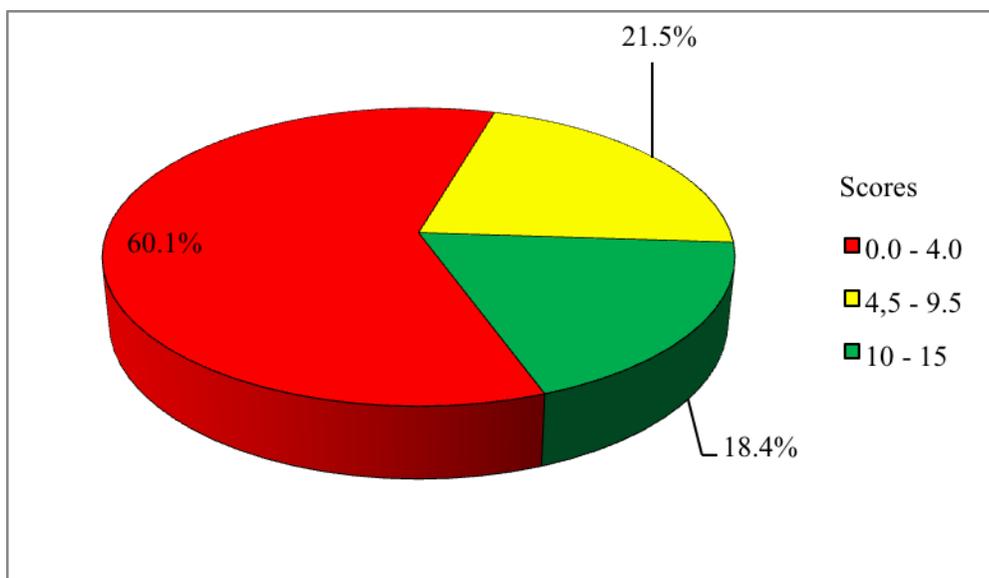
Figure 1.10: *Distribution of candidates' scores in question 10*

Figure 1.10 shows an average performance of the candidates in the question. The analysis of responses from candidates with good performance in the question revealed that most of them gave correct points on advising farmers on how to detect a sick animal. This was due to the fact that the candidates had adequate knowledge and field practical skills in signs and symptoms of animal disease. The candidates also had good command of the English Language that enabled them to write complete sentences into meaningful paragraphs.

Moreover, the candidates demonstrated good essay organization skills that made them to arrange well the responses into the introduction, the main body and the conclusion parts Extract 1.8.1 is a sample of responses from a candidate with good performance in the question.

10. Disease is the situation where by a normal body of living organisms is interfered, most of the diseases are transmitted by pathogens, such as virus, bacteria and fungi example of the diseases, East coast fever, Heart water and mastitis, Disease is among the challenges facing livestock keepers at farm level in Tanzania. The following are the ways to detect a sick animal.

Appearance of the animal, is the general way has the animal appears, physically, an animal that sick appears to be docile most of the time, but in rabies disease dogs appears to be harsh, while goats likes much sexual action, these factor can enables them to detect the sick animal.

Defecations, is the process of removing out unwanted or undigested food materials through anus, most of the disease such as Fowl typhoid, animals diarrhoea but in some diseases animal fail to defecate and others defecate stone like structure faces this can indicate the farm that the animal is sick.

Feeding and appetites, is a ability of having eating habit most of the animals who got sickness lacks appetites example Foot and mouth disease animals fail to get appetite of eating. the foods this can enables the farm to detect that the animals are sick, since they can have wounds on their mouth.

Skin and feathers, a sick of the sick animal most of the ruminant animals got enlargement of the lymp'nodes, that cause it to be swollen on the skins, also feathers of poultry such as chickens, ducks and pigeon appears to be rough, but few can shows the sign of east cost fever disease.

Isolating behaviour, once an animal is sick most of the time they isolate themselves from the herds, or a groups, since feeling of spreading the diseases to another animals, example Babesiosis disease the animal appears to be isolated since can cause the spreading of diseases to other animals, through, sick factor you can atammar can detect the appearance of the animal.

10	Urination, u the process of removing out urine fluid through vagina or penis, A farmer can detect the sick animal by looking at urine, excreted by animal, some times animals who sicks urinate blood stained urine that a farmer detect it is babeuous disease or other diseases	
	Temperature, u the degree of hotness or coldness of the body of the animals, animal once its temperature rise than normal it indicates disease example cow 40°- 45°- and a farmer can determine the temperature by inserting thermometer into the vagina of the animal or anus.	
	Therefore diseases to animals are very bad and can cause the disadvantage to the farm such as, causes loss of water to animals, reduces the production of the animal, causes anaemia to the animal, lower maturity rate.	

Extract 1.8.1: *A sample of candidates' good responses to question 10*

The extract illustrates responses from a candidate who performed well in the question. The candidate organized well the essay and met the requirements of the question.

Some of the candidates with poor performance in the question failed to exhaust all the correct points demanded in the main body on how to detect a sick animal.

Conversely, the candidates with poor performance in the question provided incorrect responses by giving points to advise farmers on how to detect sick animals such as: *give the animal vaccination, use of medicine, use of antibiotics, wash or cleaning the place where the animals live, give the livestock enough water and food* and *provide good house construction*. Most of the responses given by the candidates were on livestock management practices. This indicates that candidates lacked knowledge and field practical exposure in the detection of signs and symptoms regarding livestock diseases.

Most of these candidates also failed to organize their responses into the introduction, the main body and the conclusion parts. The candidates directly tried to provide responses in the main body. Extract 1.8.2 is an

example of responses from the candidate who had poor performance in the question

10   diseases, are the diseases that cause by parasites and bacteria, there are the example of diseases that attached animal Anthrax, Pneumonia, East cost fever, Anaplasmosis Brucellosis and typano somiasis. The following are the active challenges facing livestock keeper a farm level in Tanzania and advise that farmer on how to detect a sick animal.

Death of animals; they are the challenges that facing livestock keeper a farm level in Tanzania because death of animal, the number of animal can death because the farmer donot treat early animal that sick, advise the farmer keepers in Tanzania they treat at early animal that sick because they can get profit.

The farmer donot need vaccination of the animal, they are the challenges of farmer in Tanzania because know farmer they need animal vacine other animal donot need animal vacine so can advise people need there animal vacine.

Collapse of marketing, this are the challenges that cause farmer of Tanzania because they collapse of market example when the farmer they can keeping livestock like beaf cattle the market was collapse because when the animal was sick they cancause diseases in other cows and the farmer donot treat of vacine early the cow cause death of animal in large and market they collapse.

The farmer they donot capital, they are the challenges that farmer they can get because when the animal was sick and the farmer donot treat a early animal they can lacd of capital because the farmer they can get profit to the and animal and get capital when they they can selling animal in the market.

| 10 | They are not need good feed animals, they are the challenges that faring livestock keepers at a farm level in tanzania because when the farmers they are not need animal good feed they can cause animials to the animal so they can aduse farmer they need animal good feed example mineral, rughagel and protein . There are we the challenges that faring livestocle keeper in at a farm y tanzania , can adule people They can keep good animal good and all nutrient that animal used and treat all animal that silk and vacine . | |

Extract 1.8.2: *A sample of candidates' poor responses in question 10*

The extract presents responses from a candidate who performed poorly in the question. The candidate provided incorrect responses on how to detect a sick animal. Furthermore, he/she failed to organize the essay into well-defined introduction, main body and conclusion parts.

A few candidates in the group managed to mention some disease symptoms in animals. This is a sign that the candidates lacked English language proficiency since responses in essay question needed detailed information. They also failed to write complete and meaningful sentences.

2.3.2 Question 11: Crop protection

The question was an essay type carrying a total of 15 marks. The candidates were required to advise farmers on six cultural weed control measures they can employ to improve production.

The question was opted by 5,748 (80.1%) candidates, out of whom 2,035 (35.4%) scored from 0 to 4 marks, 3,227 (56.1%) scored from 4.5 to 9.5 marks and 486 (8.5%) scored from 10 to 15 marks.

The analysis shows average performance of the candidates in the question, since 3,713 (64.6%) candidates scored from 4.5 to 15 marks. Figure 1.11 shows the distribution of the candidates' scores in the question.
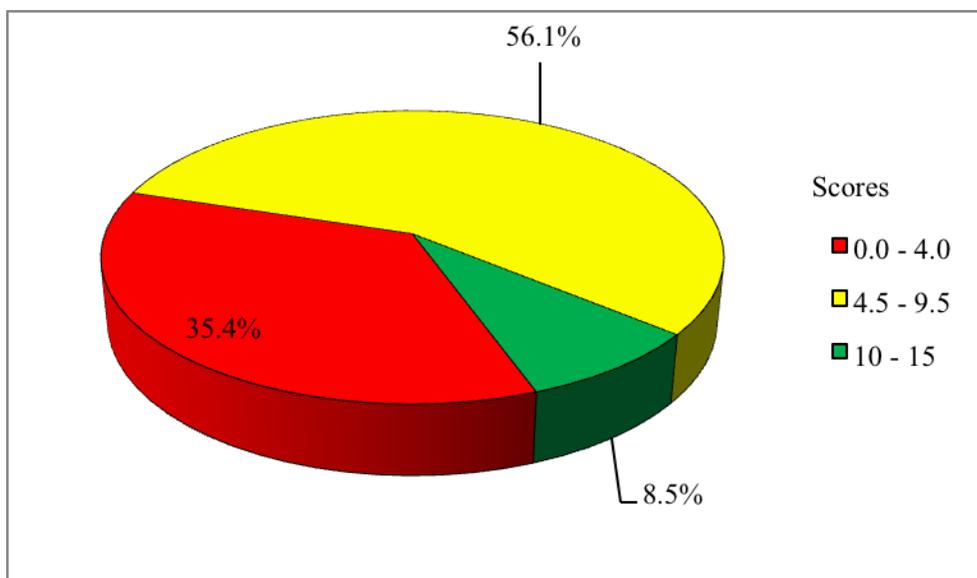
Figure 1.11: *Distribution of candidates' scores in question 11*

Figure 1.11 illustrates general average performance of the candidates in the question.

The analysis of the responses from the candidates with good performance showed that most of them gave correct responses on cultural weed control measures to be employed so as to increase production. Provision of correct responses by the candidates suggests adequate knowledge and field practical experience in cultural methods of controlling weeds.

The candidates elaborated their points clearly in paragraphs with good command of the English language and good essay organizational skills. An example of good responses to the question is portrayed in extract 1.9.1.

11   Weeds are unwanted plants which grow in areas they are not wanted. Any crop plant can be a weed if it is planted or it grows in areas it is not wanted. Examples of weeds are rape, star grass and Kikuyu grass. There are various methods of controlling weeds. Some are mechanical, biological, chemical while others are cultural. The following are cultural weed control measures that can be employed to improve production.

Crop rotation; This refers to the practice of growing different types of crop plants on the same piece of land in successive season or year. Some types of crop plants are only attacked by certain kind of weeds, thus crop rotation ensures that the crop grown on the field is not affected by the weeds. Therefore farmers are advised to employ crop rotation.

Flooding. This means the farmer allow large amount of water to enter the farmer and this water prevents air from reaching into the soil thus the weeds fail to survive. The weeds also die because they cannot get sufficient sunlight needed for photosynthesis process.

Timely planting. This means planting the crop plants at an appropriate time. This helps to prevent weeds because the crop plants grow faster and suppress the weeds. Again, the weeds will die as they will be getting a little amount of sunlight needed for the photosynthesis process. Thus the weeds will die.

11   **Mulching.** This is the practice of applying dry grasses or any mulching materials on the farm to prevent growth of weeds. Mulching prevents the weeds from getting sunlight they they fail to make their own food and therefore they die. Also mulching Save to improve Soil moisture Content, Soil temperature and prevent weeds.

           Cover Cropping. There are Some crop plants which when grown on the field tend to spread on the field and cover a large space. In this way to prevent growth of weeds. Example of Cover Crop is Sweet potatoes. When Sweet potatoes are grown on the farm they spread and occupy a large Space. In this way they help to prevent weeds,

           Proper Spacing. This means the distance between the rows and between the plant and plant within the row should be maintained properly. When proper Spacing is done. the weeds are suppressed as the Crop leaves will occupy large space and weeds will be getting little sunlight and thus they will not Survive in that Conditions.

           Therefore, Most of the weeds can be Controlled Using Cultural methods Such as proper Spacing, timely planting, Cover croping, mulching and Crop rotation. All these methods are done So as to Suppress growth of Weeds and thus improving Production in the farm.

Extract 1.9.1: *A sample of candidates' good responses to question 11*

The extract indicates responses from a candidate with good performance in the question. The candidate provided correct responses and a well-organized essay.

On the contrary, the candidates who had poor performance in the question gave incorrect cultural weed control measures that can be employed to improve production. Some of the incorrect responses provided were: *by using chemicals, by using biological control, by slashing advise them to clearing the farms* and *overgrazing.* This suggests that the candidates lacked

subject matter knowledge and skills in cultural weed control measures. The candidates also failed to give correct introductions and conclusions.

Furthermore, some of them provided the points but failed to give relevant explanations. Most of them failed to arrange the essays into introduction, main body and conclusion. Extract 1.9.2 is an example of responses from the candidate who had poor performance in the question.

11 Crop production is the process of flowering, vegetion and fruit. They are following advise farmers on six cultural weed control measures they can employ to improve production. There following point.

Control pest and disease means that crop production to adapt the pest and disease s to crop the crop is not improved produtt ion on farmer because people to get the farme to see the crops to control the pest disease be the crops control disease and pest the crops todevelopment and improved production on farmer.

Control weeds means that the farme r to control weeds the crops production to development in farmer because weed to destroy crops on farmer because people to control weed on farmer be the crops to improve production on the farmer.

Supply meas that the crops produtts on on human being to go the farmer to supply the diseases to control the diseases the crops because people to supply the crops it do improve production because the it came to supply the raw material from another control the society because the people it very careful in the farm er the disease to come to destroy crops inthe farmer the people to came the farmer to supply the disease in the far mer to crop to production on very

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11 | Importance people to Tontrol diseases in the Farmer to Tome the development ant take employ to improve production

Tontrol Soil erathon means that People to go a digging the Farmer toto ntrol the Sool erathon onthe Farmer because people to Tontrol Soil erathon because People Plantathon on the Trops en the Farmer and Tontrol Sool erathon means that the People to to Tame to Tontrol the Sool Erathon on the Farmer because the People to employ and improve Productron on the Farmer and improve the and development on the Plantathon Trops in the Farmer in Sotecty.

Tontrol The Sool availability means that the Farmer to Tontrol the soil availability on the Farmer because the sool availability es not Importance because to destroy disease on the Farmer because es not Importance on the sotecty and the Farmer because to increase the Poverty on the Tountry and Tause the Fluctuation Price on the Sotecty to Cause it Tause the Poverty on human being and Tause of is not of Food and it Tause employment on Sotecty because increase of People to Protect the. Agricultural because Agricultural is the very importance because It help to get the Food, raw material, Source of

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11 of income and Foreign exchange from another Country.

Control Fluctuation of price and dema nd means that the fluctuation of price and demand the people to control the fluctuation of price because the crop production is the avery importance in the society because people to increase the price because the very to income of PU verty in the country the farmer to plantation of crops production to decrease ate the price and demand in the society people is not development in the society. and not employ the improve product on because people to decrease the process the trops to development on the farmer and people to get the Forei gn exchange in the society and country people to the decrease the price and demand the crops production is very importance to grow and plantation of crops production to get the raw material on the society to development in the country. because the to control measure s they can employ to improve product on it very importance in the farmers and society.

Therefore the people to control the measure of the crops pro duction in the farmer is the very importance because people to control the pest and diseases, soil erosion.

Extract 1.9.2: *A sample of candidates' poor responses to question 11*

The extract is a sample of responses from the candidate who provided incorrect responses

3.0 ANALYSIS OF THE CANDIDATES' PERFORMANCE IN EACH QUESTION IN 034/2 - AGRICULTURAL SCIENCE 2

3.1 SHORT ANSWER QUESTIONS

3.1.1 Question 1: Livestock Production and Agricultural Mechanics

In this question the candidates were provided with the following: Specimens K- *Tsetse fly*, A- *Rip saw* and B- *Cross cut saw*, *hand lens*, *forceps* and *watch glass*. The question had parts (a) and (b) carrying a total of 25 marks. The candidates were required to: (a) proceed as follows:

- Put the specimen K on the watch glass with its dorsal side facing upward
- Use the hand lens to observe the specimen's wings while spreading them using forceps.

The candidates then were required to: (i) identify the specimen by its distinctive feature (ii) briefly describe the distinctive feature of the observed specimen which distinguishes it from other flies (iii) Use a hand lens to observe the mouth part of the specimen and explain the adaptive feature of the specimen that enables it to transmit disease (iv) give four harmful effects of the specimen bite to the animals apart from transmitting diseases. (v) Mention four domestic animals which are attacked by the specimen (vi) Suggest any four methods of controlling the specimen in the pasture areas.

In part (b), they were required to proceed as follows:

- Hold each specimens A and B with their teeth side facing upward
- Count the number of teeth in each specimen A and B.

Then, (i) give the number of teeth in specimens A and B (ii) comment on the size of teeth in each of the specimens A and B (iii) briefly describe the structural set up which they have observed in specimens A and B that relate to their functions.

The question was attempted by 7,117 (99.3%) candidates, of whom 2,210 (31.1%) scored from 0 to 7 marks, 4,845 (68%) scored from 7.5 to 16 marks and 62 (0.9%) scored from 16.5 to 19.5 marks.

The statistical data show good performance of the candidates in the question, whereas 4,907 (68.9%) candidates scored from 7.5 to 19.5 marks. Figure 2.1 presents candidates' scores in the question.
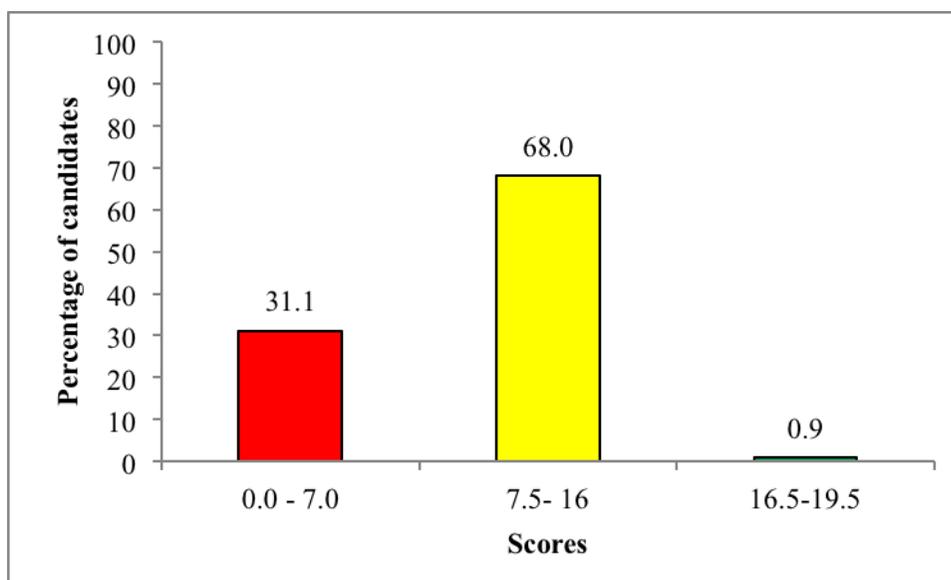
**Figure 2.1:** *Distribution of candidates' scores in question 1*

Figure 2.1 represents good performance of the candidates in the question. It was observed that most of the candidates with good performance in the question, provided correct responses in parts (a)(iv), (v), (vi), (b) (i) and (ii).

In part (a) (iv), the candidates managed to list the harmful effects of specimen K apart from transmitting diseases.

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In (a)(v), the candidates were able to mention the domestic animals which are attacked by the tsetse-fly.

In part (a) (vi), the candidates also managed to suggest the methods of controlling specimen K (tsetse fly) in the pasture areas correctly. The correct responses provided by the candidates in this part imply that the candidates had good understanding of parasites and their effect hosts.

In part (b) (i), the candidate managed to count and give the number of teeth in each of the specimens A and B.

The candidates also managed to comment on the size of the teeth in each of the specimens A and B in part (b) (ii). This shows that the candidates had enough skills in observing and counting. Extract 2.1.1 denotes one of the good responses to the question.

1. i) The specimen K is Tse Tse Fly. Because the central wing is shaped like a blade of hatchet

1. ii) The distinctive feature of the specimen that distinguish it with other flies.
   - Its proboscis extends straight forward from the head. _____ proboscis

   - The central wing of the specimen K is look like a blade of a hatchet.
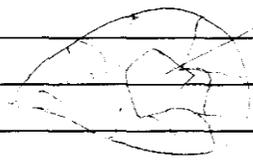
   central wing

1. iii) The mouth part of the specimen K has a long propolcis that enables it to piercing and suckling blood of animals hence enables it to transmit disease

1. iv) Harmful effects of the specimen bite to the animals
   - As it pierce and suckles blood to animals lead to anaméa to the animals.

   - As it pierce and suckles blood to the animal it put its poisonous substances from the saliva that causes skin irritation or skin itching to the animals.

1. iv) - It causes injuries and wounds to the
            animals as it pierce

         - It causes discomfort to the animals as it
            pierce and suckles blood to the animals.

1. v) Domestic animals that are attacked by the
         specimen are
         - Goats

         - Cattle

         - Sheep

         - Camels

1. vi) Controlling methods
         - Selective bush clearing in the areas which have
            the specimen

         - Burning all the pasture areas that have
            the specimen

         - Spraying and dipping the pasture areas that
            have the specimen with the chemicals that
            kills it example Aldrin solution

         - Flag the cloth that are yellow in colour so
            as to keep away the specimen or blue colour to
            attract them to the cloth that have chemical to kill.

1. b) i) The number of teeth of the specimen A is
   (153) 92

   The number of teeth of the specimen B is
   (92) 153

   ii) - Size of teeth of the specimen A are large
   and distanted each other

   - Size of teeth of the specimen B are small
   and closely to each other.

   iii) - Specimen A has a blade with teeth pattern
   whose teeth are kept slanted towards
   the front

   FIgur of
   specimen A
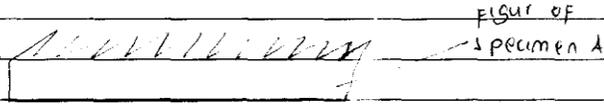
   - Specimen B has a blade with teeth pattern
   whose teeth are kept upright

   FIgure of
   specimen B
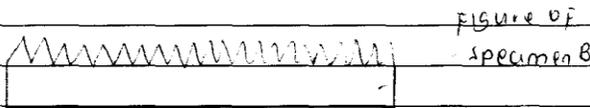
Extract 2.1.1: *A sample of candidates' good responses to question 1*

The extract indicates the candidate's good responses. The candidate managed to give correct responses to all parts of the question.

Furthermore, most of the candidates failed to identify specimen K by its distinctive features through the observation of the specimen's wings in part (a) (i). Most of the candidates gave incorrect responses on the distinctive features. They provided responses such as: *have compound eyes, they have three pair of legs, they have one pair of wings* and *their bodies are divided*

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into three parts- head, thorax, and abdomen. All the features given were characteristic of insects.

Failure of the candidates to identify the distinctive features of the specimen in (a) (ii) also caused them to fail to give brief description of the features which distinguish it from other flies. Examples of incorrect responses given were: *the other flies have two pair of wings, they have flatted head than other flies, they destroy the body of the animal inside* and *they have large in body than other flies.*

In part (a) (iii), the candidates were unable to explain the adaptive features of the specimen that enables it to transmit diseases through the observation of the mouth parts. They provided incorrect responses such as: *they have sticky for biting the animals and transmit diseases, it has round hole which help to attack animals, it have string* and *they suck blood* and *leave virus.* The responses given by the candidates in these parts are an indication that they lacked skills in the identification of the features and structures through observation.

In part (a) (iv), most of the candidates failed to give the harmful effects of the specimen's bite to the animals, apart from transmitting diseases. Examples of incorrect responses provided for the harmful effects were; *decline of milk production in dairy cattle, they may cause death to the cattle they bite animals* and *animal loose appetite.*

In part (a) (v), some of the incorrect responses given by some candidates for domestic animals which are attacked by the specimen were: *rabbits, dogs, elephant and, poultry.*

In part (a) (vi), the candidates gave incorrect responses on the methods of controlling tsetse flies such as; *spray the animal with accaricides, wash the animal with accaricides, fencing the padox and treatment of the animal before taking to the ranch in order to avoid transmission.* All these responses were attributed to inadequate knowledge of tsetse fly as an ectoparasite in livestock and poor practical skills that involve observations.

Most of the candidates also failed to describe the structural set up of specimens A and B in relation to their functions in part (b) (iii). In this part most candidates explained the functions of the specimens instead of relating

the structure and functions for the specimen. This shows failure to meet the demands of the question.

Most of the candidates failed to count and give the number of teeth and comment on the size of teeth in specimens A and B in parts (b) (i) and (b) (ii) respectively. This signifies that the candidates lacked practical skills in observing and counting.

In part (b) (iii), the candidates gave incorrect description for the structural set up of the specimens' teeth in relation to their functions such as; specimen *A-is upside down during operation and used to cut across the wood grains, have many teeth to cut the wood across the grain* and *the setup of specimen A is made up of long teeth because the main function is to cut wood along the grains while specimen B- is made up of short teeth because the main function is cut wood across the grain, has few teeth to cut wood across the grain* and *has short teeth.* The responses in this part indicate failure to meet the requirements of the question. Extract 2.1.2 shows one of the poor responses to the question.

1(i) the observe it carefully, perform the procedu
res below and then answer the questio
ns that follow
        The observe it carefully in specime
n K. are the Bee

(1 ii) by distinctive feature of the specime
n K. are the
  → It provide bee wax
  → can improve the materials

1(iii) which domestic animal are attacked by th
e specimen
  → waste disposal
  → on trees
  → our toward.

1(iv) Any four methods of controlling the speci
men in pasture areas.
  → hazard.
  → pasture
  → control pest and disease

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(1 B) Give the number of teeth in each of the specimen A and B

The number of teeth in each of the specimen A and B are the

– The number of teeth are the:

~~36~~   34

(ii) The size of teeth in each of the specimen A and B are the

The size of the teeth in each of the specimen A and B are the   15

(b iii) The structural set up which you have observed in each of specimen A and B are the

Specimen A ——————
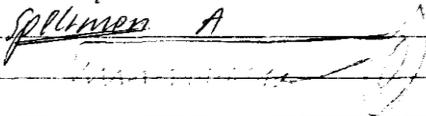
specimen B
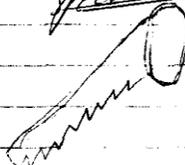
Extract 2.1.2: A sample of candidates' poor responses to question 1

The extract is a sample of responses from a candidate who performed poorly on the question. The candidate had incorrect responses in all parts of the question.

Some of the candidates in the group managed to name few effects, animals affected by and control measures of the specimen K in parts (a) (iv), (v) and (vi) respectively.

3.1.2 Question 2: Soil and its agricultural utilization and crop production

In this question, the candidates were provided with the following: specimens F1- *Moist sand*, F2- *Moist clay*, F3- *Dry sand* and F4 – *Dry clay*. The question carried a total of 25 marks. The candidates were required to:
(a) proceed as follows for field experiment A;

- Take a handful of specimen F_1. Rub the soil sample between their fingers and palm and then try to roll it into a ribbon
- Take a handful of specimen F_2 and rub the soil sample between your fingers and palm and then try to roll it into a ribbon.

(b)   Follow the following procedures for field experiment B;

- Take little amount of specimen F_3 between your fore finger and thumb. Place one drop of water and rub.
- Take little amount of specimen F_4 between your fore finger and thumb. Place one drop of water and rub.

The candidates then were required to: (i) state the experimental findings on specimens F_1 and F_2 in Field Experiment A; (ii) give reason to recommend which specimens between F_1 and F_2 is the most suitable for fish pond construction and for growing root crops; (iii) give reason to support which among the chosen specimen in item (ii) is not suitable for fish pond construction; (iv) state the aim of procedures (i) and (ii) in field experiment B (v) give reason to recommend which group of plants is suitable to be grown in an area having enough rainfall with soils rich in specimen F_4. (vi) give reasons to suggest the fertility status of specimens F_3 and F_4 (vii) give reason to suggest textural type of specimens F_3 and F_4 and (viii) advice farmers as an agronomist on four importance of carrying out procedures (i) and (ii) in the field experiment B.

The question was attempted by 7,113 (99.2%) candidates, of whom 5,052 (71%) scored from 0 to 7 marks, 2,001 (28.2%) scored from 7.5 to 16 marks and 60 (0.8%) scored from 16.5 to 23 marks.

The general performance of the candidates in the question was poor, since 2,061 (29%) candidates scored 7.5 to 23 marks. Candidate's scores in the question are shown in Figure 2.2.
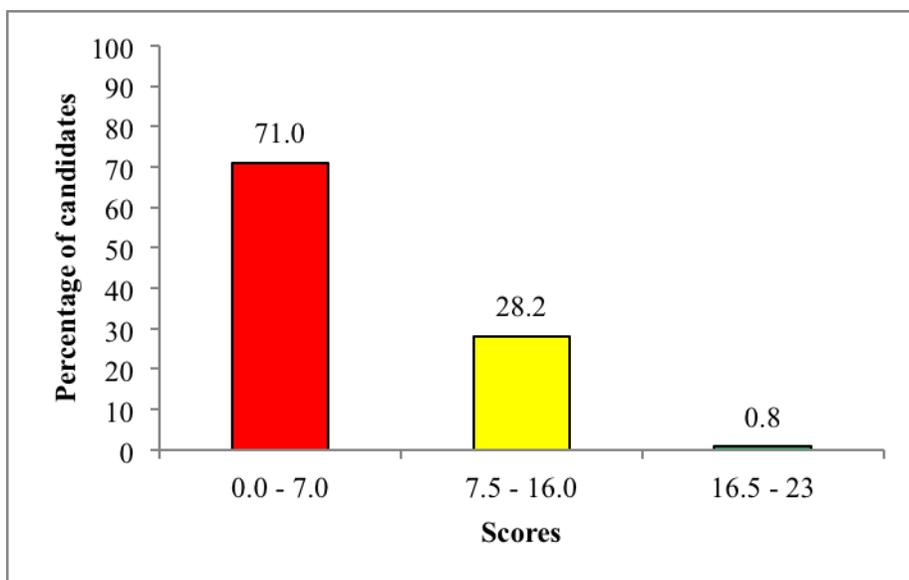
Figure 2.2: *Distribution of candidates' scores in question 2*

Figure 2.2 shows poor performance of candidates in the question. Most of the candidates provided incorrect responses in almost all parts of the question.

In item (i), the candidates failed to state the experimental findings on specimens F_1 and F_2 in Field Experiment A. candidates provided incorrect responses such as: *great feeling in specimen F_1 and plastic feeling in specimen F_2, the finding of F_1 is moist sand soil* and *the F_2 is moist clay soil*.

In item (ii), the candidates failed to give reasons to recommend which specimen between F_1 and F_2 is the most suitable for fish pond construction and for growing root crops. Some of the incorrect responses given by the candidates were: *the specimen F_1 is the most suitable for fish pond construction because sometime the fish eat the specimen, the root crops does not grow well in specimen F_1, the specimen F_2 is used for nutrients to crops* and *F_1 does not support root crop because it cause water logging*.

Similarly, in item (iii) the candidates failed to give the reasons to explain based on the specimen chosen in item (ii) in the field experiment A the specimen which is not suitable for fish pond construction and growing root crops. They gave incorrect responses like: *specimen F_2 is not suitable for fish pond construction because it has low water holding capacity, specimen*

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F₁ is suitable for fish pond construction because it has high drainage, specimen F₁ is not suitable for growing root crops because it has high holding water capacity and *F₁ is not suitable for growing crops because it does not contain any nutrient.*

In item (iv), the candidates were unable to state the aim of the procedures in field experiment B. Some of the incorrect responses given were: *to determine the water holding capacity between specimen F_3 and F_4, to test permeability of water in specimen F_3 and F_4, to identify different between specimen F_3 and F_4 and to determine the type of soil between specimen F_3 and F_4 which is beneficial to cultivation of crops.*

In item (v), the candidates failed to give reasons to recommend on the group of plants which are suitable to be grown in an area having enough rainfall with soils rich in specimen F_4. Examples of the provided incorrect responses were: *spice crops, forage crops, root crops, fibre,* and *oil-crops.*

In addition, the candidates failed to give reasons to suggest the fertility status of specimens F_3 and F_4 in item (vi). In this part, some of the candidates provided incorrect responses such as: *specimen F_3 has no fertility for planting crops, F_4 contain decomposition of organic matter, F_3 has poor or low water holding capacity, F_4 has low water holding capacity, F_3 has great soil particles* and *F_4 has small particles* were provided by the candidates. In item (vii), the candidates provided incorrect responses like *F_3 has low textural type of 0.002mm—0.2m, F_4 has high textural type of 0.2m—2.0m, F_3 and F_4 triangle texture, F_3 has small sized texture and F_4 fineness and coarseness*.

In item (viii), the candidates failed as agronomist to advise the farmers on the importance of carrying out procedures in the field experiment B. the candidates gave incorrect responses such as: *help to determine the texture of the soil, help to determine the soil pH, help to add fertilizer in the soil, it add organic matter into the soil* and *help to know the economic activities in that area.* Incorrect responses provided by the candidates in the question suggested inadequate knowledge and field practical skills in analyzing the physical properties of the soils. The responses also suggest that the candidates failed to follow the procedures of the experiments. Extract 2.2.1 shows an example of poor responses in the question from one of the candidates.

2i. Specimen F_1 and F_2 There are for sand to provided in water.

ii. The root crops in sand of F_1 and F_2 in a maize, meal etc

iii. The specimen F_3 is not suitable for fish pown d because the specimen F_2 it pon advice of water.

iv. The procedures (i) a determine a til little in amount of specimen pore finger and thumb. and (ii) in a sand clay.

v. The group of plant is suitable of grown area having enough rainfull with soil the are for the plant in a soil of specimen F_4 is advice of the maize, cocoa, coffee. etc

vi. The fertility status of specimens F_3 and F_4 is

F_3 fertility status is a pronide in the good climate and weather

F_4 fertility status are in a suppor suporting an a rain full in area

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vii | The Suggest textural type of specimen F₃ an
d F₄.

F₃ - Clay Soil

F - Sand Soil

viii i. It po provided of crop

ii. It source of the foreign exchange

iii. It provided of the marketing and trade
in area

iii. It provided of

iv. It Source of in come.

Extract 2.2.1: *A sample of candidates' poor responses in question 2*

The extract is a sample of poor responses. The candidate responded incorrectly in all parts of the question.

Contrarily, the analysis of responses from the candidates who had good performance showed that most of the candidates gave correct responses to item (ii), (iii), (iv), (vi), (vii), and (viii).

In item (ii), most of the candidates provided correct responses by giving the reason for recommending which one between the specimens F_1 and F_2 is the more suitable for fish pond construction and for growing root crops.

In item (iii), the candidates managed to suggest with reasons from the specimen chosen in field experiment A the specimen which is not suitable for fish pond construction and growing root crops. The candidates likewise managed to state the aim of procedures in field experiment B.

Moreover, in item (vi), the candidates provided correct responses by suggesting the fertility status of the specimens F_3 and F_4.

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In item (vii), the candidates also responded correctly by giving the reasons for suggesting the textural types of specimen F_3 and F_4. The candidates also managed to give the correct advice to farmers on the importance of carrying out procedures (i) and (ii) in the field experiment B. The provision of correct responses to most parts of the question indicates that the candidates were knowledgeable enough and had field practical experience on the analysis of the physical properties of the soil. Extract 2.2.2 is an example of good responses in the question.

2. (a) For field experiment A	
(i) A handful of specimen F_1 was rubbed between fingers and palm and then tried to be rolled into ribbon.	
(ii) A handful of specimen F_2 was put on hand rubbed palmed and tried to be rolled into ribbon.	
(b) For field experiment B.	
(i) A little amount of specimen F_3 was put between fore fingers and thumb, then one drop of water was added and rubbed.	
(ii) To little amount of specimen F_4 between fore finger and thumb, one drop of water was added and rubbed.	
• Questions	
(i) Experimental findings for specimen F_1 and F_2 for field experiment A.	

Specimen	Experimental findings.
F_1	(i) Its feel was gritty.
	(ii) It resisted rolling into a ribbon, rather it broke.
F_2	(i) Its feel was sticky.
	(ii) It was rollable into a ribbon with easy without breaking for more than two (2) inches

2. (vii) To suggest textual type of specimens F3 and F4.

• Specimen F3 is ~~Coarse~~ sand soil (Coarse sand soil) because:

(i) In feel test its feel is gritty.
(ii) It does not hold and saturate water well.
(iii) It breaks easily even after moisturing.

• Specimen F4 is silt class of texture because;
(i) In experiment for feel test

• Specimen F4 is clay in textual class because;
(i) It feels sticky when mixed with water.
(ii) It is resistant to breaking when moistened

2. (viii) The importance of carrying out procedure (i) and (ii) in field experiment B are;

(i) It helps to determine aeration of the soil.
(ii) It helps to determine soil water holding capacity.
(iii) It helps to determine infiltration of water through the soil.
(iv) It helps to determine the best soil suitable for agriculture.

2. (v) Recomended group of plants suitable to be grown in area with enough rainfall and soils rich in specimen F4 is "HYDROPHYTES" such as paddy because such crops needs a lot of water and specimen F4 has high water holding capacity for growth of such crops, medium

2. (iv) The aim of procedure (i) and (ii) in field experiment B is to determine soil texture. (Determination of soil textual class of specimen F3 and F4).

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2. (vi) To suggest fertility status of specimens F₃ and F₄

(a) Specimen F₃ has poor fertility (very poor fertility) because:
(i) It has very low nutrient holding capacity
(ii) It has very Low organic matter content for supply of nutrients
(iii) It has poor water holding capacity hence easy leaching.

(b) Specimen F4 has high fertility, because;

(i) It has high content of organic matter
(ii) It has high ability to retain nutrients.
(iii) It has high water holding capacity and therefore leaching does not occur easily.

Extract 2.2.2: *A sample of candidates' good responses to question 2*

The extract is a sample of responses from a candidate who performed well in the question. The candidate managed to provide correct responses to most parts of the question.

4.0 PERFORMANCE OF THE CANDIDATES ON EACH TOPIC/FIELD

The performance in a topic/field is described as good, average or poor depending on the number of candidates who scored an average of 30 marks and above. If the percentage of the candidates who scored 30 marks and above ranges from 0 to 29, 30 to 64 and 65 to 100 the performance is poor, average and good respectively. The candidates' performance in different topics/fields in the 2019 CSEE is shown in Appendix I whereby green, yellow and red colours denote topics/fields in which the candidates had good/average and poor performance respectively.

The candidates had good performance in multiple topics in multiple choice items (86.6%) and field of Live Production and Agricultural Mechanics (68.9%).

The topics in which the candidates had average performance were Crop Protection (64.6%), Agricultural Mechanization (62.9%), Farm Records

and Accounts (61.6%), Soil and Water Conservation (59.7%), Dairy Cattle Production (55.2%), Agricultural Extension in matching items (45.6%), Agricultural Science Laboratory (43.4%) and Livestock Health and Diseases (39.9%),

However, the candidates performed poorly in the fields of Soil and its Agricultural Utilization and Crop Production (29%) and topics on Soil Plant Nutrients (19.2%) and Production of Crops (9.6%).

The data shows that the candidates maintained good performance in multiple- topics in multiple choice items in 2019 as it was in 2018. However, the performance in the fields of Livestock Production and Agricultural Mechanics has improved to good in 2019 from average in 2018.

The candidates performed averagely on essay questions from the fields of Livestock production and Crop Production in both years 2019 and 2018. Likewise, the performance in the topics from the field of Agricultural Mechanics remained average in 2019. In 2019 the topic from the field of Farming Business Economics had its performance improved to average from poor in 2018.

Furthermore, the performance in the topics from the field of Livestock production has improved to average compared to poor performance in 2018. The performance of the candidates in matching items has also increased to average in 2019 from poor in 2018.

However, the performance from the fields of soil and its Agricultural Utilization and Crop Production has deteriorated to poor in 2019 from average 2018.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusion
NECTA Statistics book CSEE 2019 issued in January 2020 shows that, the performance of the candidates who sat for the Agricultural Science subject examination was average. The data indicate that the candidates have passed by 64.73 percent which is an improvement by 11.79 percent compared to the performance in 2018.

Despite the improvement in percentage of the candidates who passed the examination, the majority of the candidates who sat for and passed the examination scored the lowest pass grade. According to Table 1, (Performance of the Candidates in CSEE 2019 by Grades), 66.27 percent of the candidates who passed scored grade D. Most of the candidates who scored low marks in the examination were observed to have inadequate subject matter knowledge in topics examined in the questions. The analysis of responses from the candidates showed that, inadequate knowledge was the major factor that caused the candidates either to provide the incorrect responses or fail to attempt the questions.

Inadequate knowledge was backed up by the candidates' poor skills in practicals. The candidates were found to lack both field and laboratory practical exposure. Many of the questions in the theory and practical papers were activity oriented, thus lack of adequate practical skills made them unable to provide correct responses.

The failure to meet the demands of the questions was another factor that led the candidates to provide incorrect responses and hence scoring low marks. The candidates failed to understand the demands of the questions, for this reason they had misconceptions of the requirements of the question and ended up providing responses which were not related to the questions.

Furthermore, candidates' item response analysis from the candidates who scored high marks in the examination revealed that the candidates were knowledgeable enough and well equipped in practical skills on the subject matter in the topics examined. The candidates also had a clear understanding of the demands of the questions, the factor that caused them to provide correct responses to the questions.

5.2   Recommendations

The findings in this report revealed general average performance with an increase in the number of candidates who passed the examination compared to the results in 2018. Education stakeholders particularly subject teachers and students must make efforts to improve the performance of the candidates in future examination.   The report recommends the following measures to be taken:

(a)   Schools should establish farms and gardens for different crops to help students learn through practice. Learning through practice will enhance their competence in various aspects such as weed control methods.

(b)   Teachers should make effective use of the appropriate teaching aids as per syllabus teaching learning strategies. This will enhance student interaction and hence enhance knowledge acquisition. For example, through pictures and diagrams students can learn and understand deficiency symptoms of plants nutrients and how to render first aid to injured persons or victims of accidents.

(c)   Teachers should use participatory methods in the teaching–learning process. Learner centered approaches such as brainstorming and discussions should be used in the process to encourage sharing of information among students and working together to solve common problems.

(d)   Teachers should regularly invite guest speakers to impart knowledge and skills to students on various issues. Apart from adopting a team teaching technique, guest speakers are important part of the educational experience for students. They expose students to real-world life experiences. For example, teachers can invite a veterinary doctor and an extension officer to talk about how to identify a sick animal and importance of using machine in farm operations respectively.

(e)   Teachers should make demonstrations where applicable. Teachers' demonstrations are important because they provide students with experiences of real events, phenomena and helping them learn, raise student's interest and motivation.

(f)   Teachers should organize educational visits to various places. Study visits are important because they help students to learn through the visual experience and can be an interesting way to explore new things to both the learner and the teacher. For example, study visit to a dairy farm can help students learn about management practices of dairy cattle. Also visits either to irrigation

skims or hydroelectric power station can help students to learn on water conservation.

(g)   Teachers should put more emphasis on practical sessions. Practicals translate theory into practice, thus exposure of the students to practicals in the laboratory and the farm workshop will enable the students to acquire appropriate knowledge and skills in different subject matter as students learn better by doing. For example, practicals on analysis of physical properties of the soil in the laboratory help students to understand better the subject matter.

Performance of candidates in each topic/field in the 2019 CSEE Agricultural science

SN	Topic/Sub-Topic	Question number	Percentage of the Candidates who Scored the Average of 30% or Above	Comments
		1	86.6	Good
	Livestock Production and Agricultural Mechanics	1 (P 2)	68.9	Good
	Crop Production (Crop Protection)	11	64.6	Average
	Agricultural Mechanics (Agricultural Mechanization)	6	62.9	Average
	Farming Business Economics (Farm Records and Accounts)	7	61.6	Average
	Agricultural Mechanics Soil and Water Conservation	9	59.7	Average

Livestock Production (Dairy Cattle Farming)	5	55.2	Average
Matching Items (Agricaltural Extension)	2	45.6	Average
Fundamentals of Agriculture (Agricultural Science Laboratory)	8	43.4	Average
Livestock Production (Livestock Health and Diseases)	10	39.9	Average
Soil and its Agricultural Utilization and Crop Production	2 (P 2)	29	Poor
Soil and its Agricultural Utilization (Soil Plant Nutrients)	4	19.2	Poor
Crop Production (Production of Crops)	3	9.6	Poor