THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
**NATIONAL EXAMINATIONS COUNCIL OF TANZANIA**

# CANDIDATES' ITEM RESPONSE ANALYSIS REPORT ON THE CERTIFICATE OF SECONDARY EDUCATION EXAMINATION (CSEE) 2021

# AGRICULTURAL SCIENCE

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# 034 AGRICULTURAL SCIENCE

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# FOREWORD

The Agricultural Science Candidates' Item Response Analysis report on the Form Four National Examination (CSEE) 2021 is written to provide feedback to candidates, teachers, parents, policy makers and other education stakeholders on the candidates' performance in this subject.

The CSEE is a summative evaluation administered at the end of the four years of study in secondary education. The examination aims to evaluate the candidates' learning and academic achievement. It illuminates areas of strengths and gaps in the education system as well as delivery. Examination results provide feedback to the general public on the candidates' performance.

Data show that the candidates' performance in this year's examination is good because most of those who passed the examination scored high grades. This report points out the reasons for such good performance and the challenges that led to the weak performance of a few candidates. The analysis reveals that the candidates with higher scores had a good understanding of the subject matter and mastery of the English language. They also demonstrated good practical skills. These enabled them to identify and address accordingly the requirements of the questions. However, the few candidates with weak performance had insufficient knowledge of the subject matter, hence provided incorrect responses.

The National Examination Council of Tanzania expects that the recommendations provided in this report will be useful to students, teachers and other education stakeholders to identify proper measures to improve candidates' performance in future examinations.

Finally, the Council is grateful to the examination officers and all who participated in the preparation of this report.

Dr Charles E. Msonde
**EXECUTIVE SECRETARY**

# 1.0 INTRODUCTION

This report presents the performance of the candidates who sat for the Certificate of Secondary Education Examination (CSEE) 2021 in the Agricultural Science subject. The examination was set according to the 2019 examination format, which is based on the 1997 Agricultural Science syllabus; it intended to measure the competences acquired by the candidates after completing the four years of study in Ordinary Level (O-level) secondary education.

The examination consisted of 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 a total of 100 marks. Section A had two objective questions, Multiple-Choice Items and Matching Items, in questions 1 and 2 respectively. The Multiple Choice question consisted of ten items, each carrying 1 mark, making a total of 10 marks for the question. The Matching Items question consisted of five items, each carrying 1 mark, making a total of 5 marks for the question. The section carried a total of 15 marks. Section B comprised seven short-answer questions, each carrying 10 marks, making a total of 70 marks in this section. The candidates were required to answer all the questions in sections A and B. Section C had two essay questions, each carrying 15 marks. The candidates were required to answer only one question. The section carried a total of 15 marks.

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

A total of 6,776 candidates sat for the examination; among them 6,056 (89.68%) passed and 697 (10.32%) failed. However, there is an increase of 9.62 per cent pass this year as compared to the 2020 results, where 5,453 (80.06%) candidates passed and 1,358 (19.94%) failed. Generally, the trend of the candidates' performance from 2018 to 2021 has been increasing as shown in Figure 1.
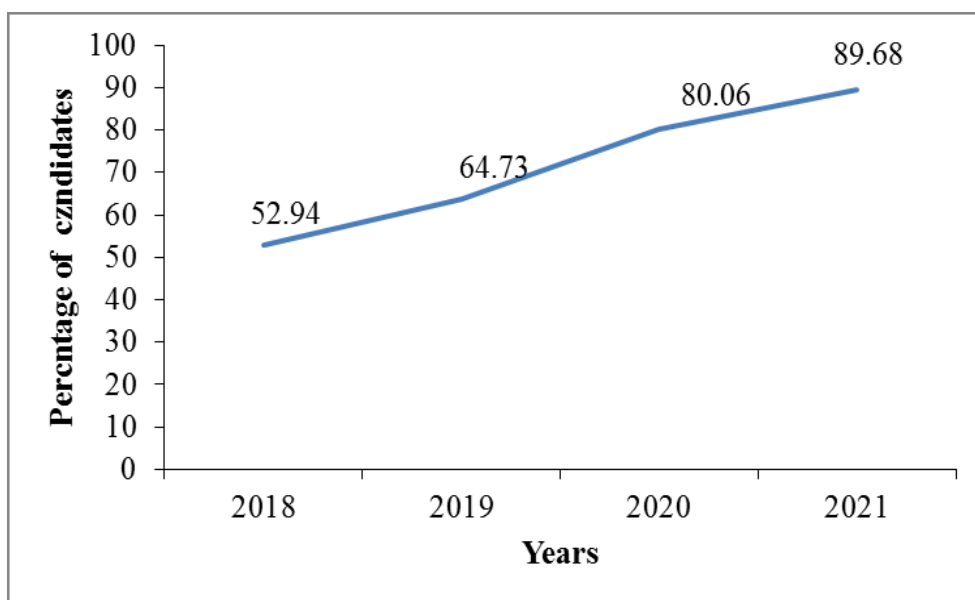
**Figure 1:** *Percentage of Candidates who passed in CSEE 2018 – 2021*

Figure 1 illustrates an increase in the percentage of the candidates who passed the examination in different years. The candidates' performance by grades in CSEE 2021 in the subject is summarised in Table 1.

**Table 1**: Candidates' Performance by Grades in the Agricultural Science CSEE 2021

| Grades | A | B | C | D | F | Withheld | Total |
|--------|-----|-----|-------|-------|-----|----------|-------|
| **Male** | 55 | 336 | 1,929 | 1,051 | 255 | 14 | 3,616 |
| **Female** | 13 | 134 | 1,333 | 1,205 | 442 | 9 | 3,127 |
| **Total** | 68 | 470 | 3,262 | 2,256 | 697 | 23 | 6,753 |

**Source**: NECTA Statistics Book, page 8 CSEE, 2021

Table 2 portrays the performance of the candidates by grades. The performance is characterized into five grades (A, B, C, D and F). Each grade had a respective score interval and remark, as follow: A (75-100) Excellent, B (65-74) Very good, C (45-64) Good, D (30-44) Satisfactory and F (0-29) Fail.

The report encompasses the analysis of candidates' performance on each question and the analysis of candidates' performance on each topic and field. The two are supported by data and illustrations. The report also

entails an overview of the analysis and gives recommendations on how to improve the candidates' performance.

## 2.0 THE ANALYSIS OF THE CANDIDATES' PERFORMANCE ON EACH QUESTION

This section presents the analysis of the candidates' performance on each question. It highlights the requirements of the questions, the candidates' responses and possible reasons for their performance. Moreover, sample extracts representing the candidates' responses to each question are included to illustrate the cases presented. In the analysis, the performance is considered weak, average or good if the percentage of candidates' scores ranges between 0-29, 30-64 and 65-100, respectively. Three colours (green, yellow and red) are used to indicate good, average and weak performance levels, respectively.

### 2.1 034/1 AGRICULTURAL SCIENCE 1

#### 2.1.1 Question 1: Multiple-Choice Items

This question consisted of ten items, drawn from the topics of Environmental Degradation, Farm Power Machinery, Methods of Improving Soil Fertility and Productivity, Crop Protection, Factors Affecting Livestock Production in Tanzania, Agriculture as a Science, Agricultural Marketing and Annual Field Crops Production. The candidates were required to choose the correct answer from the given alternatives and write its letter besides the item number in the answer booklet provided.

The question was attempted by 6,776 (100%); candidates among them, 342 (5.0%) scored from 0 to 2 marks; 5,035 (74.4%) scored from 3 to 6 marks and 1,399 (20.6%) scored from 7 to 10 marks. The general performance on the question was good. Figure 2 illustrates the distribution of candidates' scores on the question.
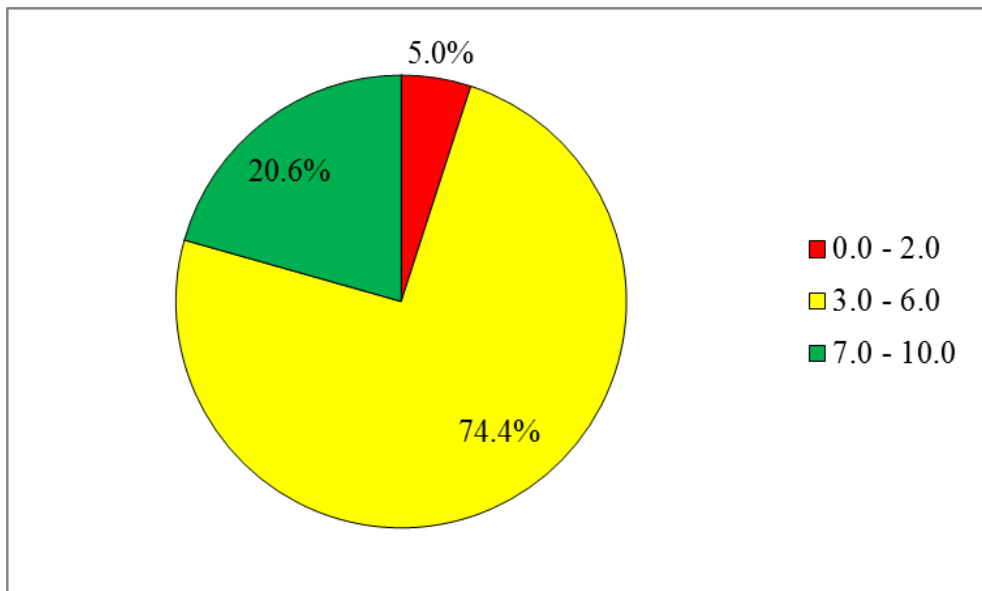
**Figure 2:** *Distribution of Candidates Scores on Question 1*

Figure 2 shows that the majority of the candidates (95%) scored from 3 to 10 marks while 5 per cent scored from 0 to 2 marks. The analysis shows that most of them provided correct responses to items (i), (ii), (iii), (v), (vi), (vii), (viii) and (ix). However, the candidates provided incorrect responses to items (iv) and (x). The analysis of the candidates' responses on each item is as follows:

Item (i) required the candidates to choose an alternative that represents fishing the activity that brings about water bodies' degradation. The item tested the candidates' understanding of the sustainable fishing methods. The correct option was B (through using explosives). The distractors given were A (through using canoes), C (through using recommended size of fishing nets), D (through using hook and line) and E (through using boars). The majority of the candidates provided the correct response. This indicates that they had a good understanding of the safe and sustainable fishing methods. The use of explosives was the only method that harms water bodies. This involves the use of explosives such as dynamite to kill fish. It also pollutes water. All the distractors were safe methods which do degrade water bodies. Alternative A (through using canoes) involves paddling to a fishing spot and fish using lines or meshed nets; alternative C (through using the recommended size of fishing nets) is the fishing of marketable sized fish by using meshed nets; alternative D (through using hook and line) involves

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setting a fishing line in the water with baited hooks; and alternative E (through using boars) is the habit of boars to catch fish.

Item (ii) required the candidates to choose an alternative that is a reason why animals such as horses, donkeys, oxen and mules have been used more as a source of power than others. The item examined the candidates' knowledge of the characteristics of draught animals. The correct response was D (they are generally hardy, strong, and easy to feed). The distractors given were A (they require adequate grazing land which is available everywhere), B (their working speed is very high), C (they can work well in all soil types, light soil and heavy soil) and E (they can easily be trained to become oxen for farm work). Most of the candidates' attempted the item correctly. This signifies that they were knowledgeable about the desirable qualities of draught animals. Draught animals are the animals used for doing farm work. Being hardy and strong are the fundamental qualities of a draught animal. That is why the animals named are more used as a source of power on the farm. The distractors were not the characteristics of animals that are used as a source of power on the farm.

Item (iii) required the candidates to choose an option that represents the class in which Nitrogen, Phosphorus and Potassium plant nutrients belong. The item measured the candidates' understanding of the types of plant nutrients. The correct option was C (macro nutrient). The distractors were A (micro nutrients), B (minor nutrients), D (trace nutrients) and E (microbial nutrients). Most of the candidates provided the correct response, the reason that is attributed to good understanding of the types of plant nutrients. There are two types of plant nutrients, namely macro and micro/trace elements. Macro elements include Carbon, Oxygen, Hydrogen, Nitrogen, Phosphorus, Potassium, Magnesium, Calcium and Sulphur whereas micro elements constitute Manganese, Iron, Boron, Molybdenum, Copper, Zinc and Chlorine. The nutrient elements asked in the question fall under the category of macro nutrients.

In item (iv), the candidates were required to choose an alternative which is a cultural practice that is used to control the spread of plant diseases by uprooting and destroying diseased plant. The item tested the candidates' knowledge of the cultural practices used to control plant diseases. The correct response was D (rogueing). The distractors were A (uprooting), B

(mowing), C (ring- barking), and E (destroying crop residues). Most of the candidates provided incorrect responses. This indicates that they lacked knowledge of controlling plant diseases using cultural practices. Rogueing is the practice that involves uprooting and destruction. Options A and E were incorrect because they involve one activity, either uprooting or destruction. The candidates who chose option B did not understand that mowing means slashing, it neither involves uprooting nor destruction. Likewise, those who chose option C failed to understand that ring-barking does not involve uprooting and destruction. It is the removal of barks from the stem of plants.

Item (v) required the candidates to choose an option which is a symptom for a cattle disease that is transmitted by brown ear ticks. This item measured the candidates' knowledge of animal diseases. The correct response was B (increasing lachrymation). The incorrect alternatives were A (tongue becomes out), C (bloody diarrhea), D (loss of appetite) and E (difficulty in breathing). The majority of the candidates chose the correct response, indicating their adequate knowledge of the diseases transmitted by brown ear ticks. The candidates were familiar that brown ear ticks transmit East Coast Fever whose symptoms involve increasing lachrymation. Alternatives D and E are the general symptoms of a sick animal, and they cannot be transmitted. Alternative A is a symptom of the Heart water disease, which is transmitted by bont ticks while alternative C is a symptom of Rinderpest which is transmitted through contact.

Item (vi) required the candidates to choose an alternative which is a reason why agriculture is regarded as an art. The question assessed the candidates understanding of the concept of agriculture. The correct response was E (it involves application of skills which can be manipulated). The incorrect options were A (it involves collecting seeds and domesticating), B (it involves cultivation of land to grow crops and the rearing of livestock), C (it comprises several branches of study) and D (it integrates several subjects such as mathematics and plant breeding). The majority of the candidates responded correctly to the item. They clearly understood that agriculture is an art since it embraces the knowledge of how to perform the operations of the farm skillfully, but it does not necessarily include an understanding of the principles underlying farm practices. In view of this, the distractors provided did not qualify agriculture to be regarded as an art.

Item (vii) required the candidates to choose the option representing the climatic factors affecting livestock industries in Tanzania. The item examined the candidates' knowledge of the factors affecting livestock production. The correct response was A (rainfall and temperature). The distractors were B (soil fertility and soil types), C (capital and labour availability), D (knowledge and infrastructure) and E (pest and disease). The majority of the candidates attempted the item correctly. This indicates that they had adequate knowledge of the climatic factors affecting livestock production. Option A was the only one that contained the climatic factors. Option B contained edaphic factors; C consisted economic factors; D comprised institutional factors and E had biological factors.

In item (viii), the candidates were required to choose the organ that approves by-laws made by co-operative societies under the rules of the Co-operative Societies Ordinance. The item tested the candidates' understanding of the organizational structure of cooperatives. The correct response was C (The Registrar of Co-operatives). The distractors were A (The Tanzania Federation of Co-operatives), B (The Tanzania Co-operative Development Commission), D (The Principles of Co-operation) and E (The Unions). The item was correctly attempted by the majority of the candidates. This shows that they were knowledgeable about the roles and responsibilities of cooperative organs. The candidates understood that cooperative by laws are approved by the registrar of the cooperatives. The organs in the distractors perform other functions such as capacity building, lobbying and advocacy, marketing, members access to financial services and regulating and promoting the development of the cooperative sector.

Item (ix) required the candidates to choose the option which is a combination of the best methods of controlling maize weevil in the store among the following: (1) dusting the maize cobs or shelled maize with malathion or actellic (2) use of weevil proof stores (3) legislative method (4) fumigating stored maize with methyl bromide (5) proper storage hygiene. The item assessed the candidates' knowledge of and skills in controlling storage pests. The correct response was E (1, 4 and 5). The distractors were A (2 and 4), B (2, 3 and 4), C (1, 3 and 4) and D (3 and 4). Most of the candidates' provided the correct response to the item. This signifies that they were knowledgeable about and skilled in the methods of controlling maize weevil in the store. The distractors contained a combination of methods that

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were not appropriate for controlling maize weevils. For example use of weevil proof stores and legislative method can not be used for the purpose. There are no weevil proof stores, and even weevils can not be controlled by quarantine.

Item (x) required the candidates to choose the option representing a reason for earthening–up in the field of root crops. The item assessed the candidates' knowledge of and skills in the management practices required when growing annual field crops. The correct response was A (to provide more soil cover around the root and help to conserve moisture). The distractors given were B (to protect diseases of the root crops and increases market value), C (to prevent spread of disease or build- up of pest), D (to reduce high competition for nutrients and water), E (to train the plant so that they can grow in one direction). Most of the candidates incorrectly attempted the item. This indicates that they had inadequate knowledge of and skills in the management practices to be employed when growing root crops. Earthening-up is a technique of pilling soil up around the base of a plant The candidates chose different distractors. Most of them selected option E (to train the plant so that they can grow in one direction). The candidates had the wrong perception that plants have to grow in one direction. Generally earthening-up can not prevent diseases and pests attack on crop plant. Moreover, it can not increase the market value of the crop and reduce competition the water and nutrients.

## 2.1.2 Question 2: Matching Items

The question consisted of five items from the topic of Factors Affecting Crop Production. The candidates were required to match the items in List A with their respective responses in List B by writing the letter of the correct response beside the item number in the answer booklet. List A comprised crops attacked by different pests whereas List B comprised crop pests. The question measured the candidates' knowledge of crop pests. The premises and responses to the question are given in the following table.

| List A | List B |
|---|---|
| (i) The pest which attacks maize plant in the field. | A. Rhinoceros beetle |
| (ii) The pest which attacks cotton in the field. | B. Mealy bug |
| | C. Army worm |
| (iii) The pest which attacks coconut in the field. | D. Orange dog |
| (iv) The pest which attacks cassava plants in the field. | E. Thrip |
| (v) The pest which attacks onion in the field. | F. Stainers |
| | G. Sudan dioch |

The question was attempted by 6,773 (100%) of the candidates; among them 4,124 (60.9%) scored from 0 to 1 mark; 2,247 (33.2%) scored from 2 to 3 marks and 402 (5.9%) scored from 4 to 5 marks. The general performance on this question was average. Figure 3 indicates the distribution of candidates' scores on the question.
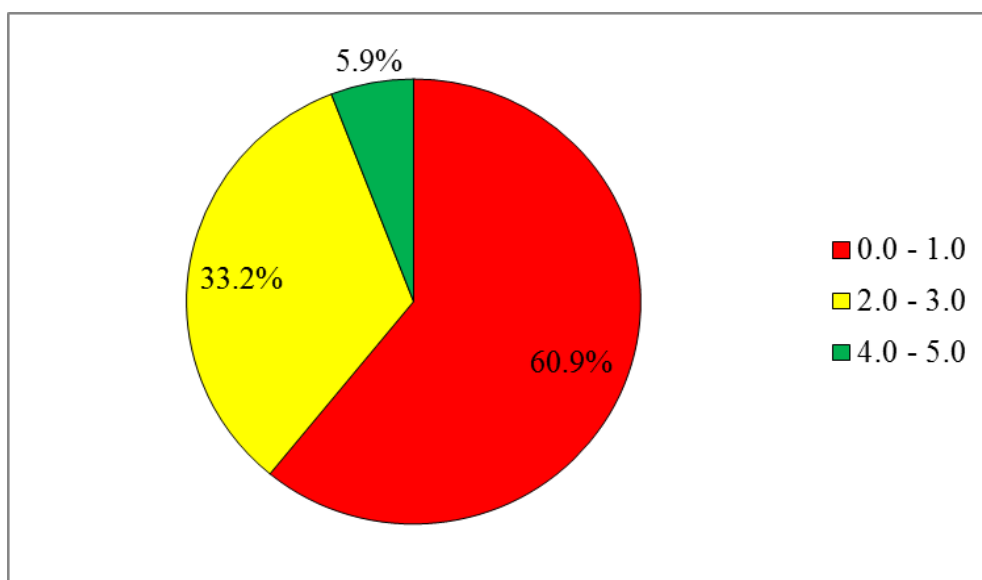


**Figure 3:** *Distribution of Candidates' Scores on Question 2*

Figure 3 shows 39.1 per cent of the candidates scored from 2 to 5 marks, and 60. 9 per cent scored from 0 to 1 mark. The majority of the candidates

performed well on items (i), (iv) and (v) but failed on items (ii) and (iii). The analysis of their performance on each item is as follows:

Item (i) required the candidates to provide the correct response that matches the statement 'the pest which attacks maize plant in the field'. Most of the candidates gave the correct response which, was C (Army worm). This indicates that the candidates had a good understanding of the pests which attack maize.

Item (ii) required the candidates to provide the correct response that matches the statement 'the pest which attacks cotton in the field'. The correct response was F (Stainers). The majority of the candidates gave incorrect responses. This implies that they lacked knowledge of the pests which attack cotton. Most of the candidates selected A (Rhinocerous beetle). They failed to understand that this pest attacks coconuts.

In item (iii), the candidates were required to provide the correct response that matches the statement 'the pest which attacks coconut in the field'. The correct response was A (Rhinocerous beetle). Most of the candidates gave incorrect responses. This implies that they lacked adequate knowledge of the pests which attack coconuts. Most of the candidates selected F (Stainers). They failed to understand that this pest attacks cotton.

In item (iv), the candidates were required to provide the correct response that matches the statement 'the pest which attacks cassava in the field'. The majority of the candidates provided the correct response, B (Mealy bug). This signifies that they possessed adequate knowledge of the pest.

Item (v) required the candidates to provide the correct response that matches the statement 'the pest which attacks onion in the field'. Most of the candidates provided the correct response, E (Thrip). This suggests that they had adequate knowledge of the pest that attacks onion. Generally, the candidates seemed to lack sufficient exposure to field practicals that could enable them to know the pests that attack different crops.

## 2.2  SECTION B: Short Answer Questions
### 2.2.1 Question 3: Agricultural mechanisation

The question required the candidates to (a) give six points on why mechanisation is important in agriculture and (b) account for four advantages of using ox plough in cultivation. The question measures the candidates' knowledge of and skills in agricultural mechanisation.

The question was attempted by 6,763 (99.8%) of the candidates; among them 768 (11.4%) scored from 0 to 2.5 marks; 2.934 (43.3%) scored from 3 to 6 marks and 3,061 (45.3%) scored from 6.5 to 10 marks. These data indicate that the candidates' performance on the question was good. Figure 4 represents the distribution of candidates' scores on the question.
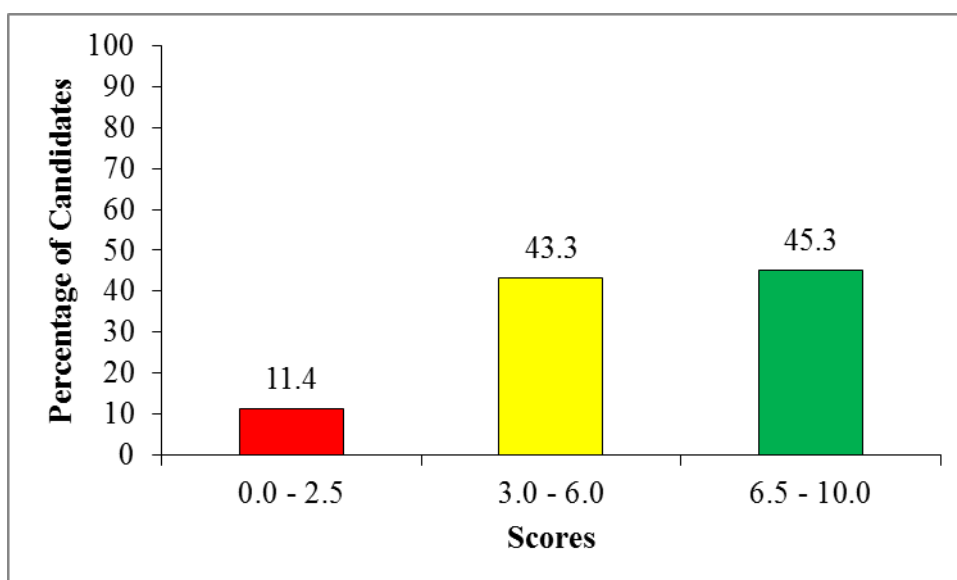


**Figure 4:** *Distribution of Candidates' Scores on Question 3*

Figure 4 indicates that the majority of the candidates (88.6%) scored from 3 to 10 marks, whereas 11.4 per cent scored from 0 to 2.5 marks. The analysis shows that the candidates who performed well on the question responded correctly to almost all parts of the question. In part (a), they correctly gave the importance of mechanisation in agriculture like the *possibility of reducing production cost, reduce drudgery involved with hard or dirt work and increase land productivity*. Similarly, in part (b), they accounted for the advantages of using ox-plough in cultivation. For example, some of the candidates responded as follows: *cheap to buy and maintain for small scale*

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*farmers, they have low run cost and they need less skills to operate*. This shows that they possessed sufficient knowledge of and skills in agricultural mechanisation. Extract 1.1 is a sample of the correct responses to this question.



**Extract 1.1:** *A sample of the correct responses to Question 3*

Extract 1.1 are the responses from a candidate who attempted well in both parts of the question, signifying adequate knowledge of and skills in the subject matter.

Analysis shows that 43.3 per cent of the candidates had average performance on the question. Most of them correctly attempted part (a) of the question. However, they failed to account for the advantages of using ox-plough in cultivation in part (b).

Nevertheless, 11.4 per cent of the candidates who attained weak performance on the question failed to give the importance of mechanisation in agriculture. They provided responses such as *to control soil erosion, not expensive, it maintains animal power, to control pest and diseases, it helps to provide fuel and source of foreign exchange* in part (a). In other cases, some of the candidates mentioned sources of power like *solar power, animal power, water power* and *wind power*. Furthermore, others provided the importance of agriculture such as *source of food, it provides employment, source of raw material in industrial* and *source of income* instead of importance of agricultural mechanisation.

Moreover, in part (b), they failed to account for the advantages of using ox plough in cultivation. For example, some of the candidates provided incorrect responses such as *help mixing of soil, used by the people who study machines, it improves soil constituent, it need many labour, and it needs skills, it does not need fluctuations, it produces goods and services and high technology*. These responses imply that the candidates lacked knowledge of and skills in agricultural mechanisation. Extract 1.2 is a sample of the candidates' incorrect responses to the question.

| | | |
|---|---|---|
| 3. a) i) Because It help to provide food for animal and human being. | |
| ii) Because It help to provide income. due to that when people to go the agriculture to increase income. | |
| iii) Because It help to provide employment. This due to that when people to agriculture and go the come in labour to increase employment. | |
| iv) Be | |
| v) Because it help to provide raw materials. This work in agriculture to improved of raw materials in agrrcultural production. | |
| vi) Because It help to provide foreign exchange - This due to that when people to exchange in maize, and Ground nuts other people to peop teto include exchange, | |
| b) Advantage of ox-plough in cultivation. | |
| i) To high agrrcultural | |
| ii) To the farm in fast of agriculture. | |
| iii) To high production | |
| iv) Availability of high land | |

**Extract 1.2:** *A sample of the incorrect responses to Question 3*

In Extract 1.2, the candidate responded incorrectly to all parts of the question. For example, in part (a), he/she gave the importance of agriculture instead of the importance of agricultural mechanisation.

### 2.2.2 Question 4: Farm Records and Accounts

The candidates were required to prepare a balance sheet to show the financial position of Mr Mapato's farms as at 30th March 2016, given the following scenario: Cash in hand Tshs. 200,000/=, cash in bank Tshs. 4,000,000/=, 20 cattles each Tshs. 200,000/=, 130 sheep each Tshs. 25,000/=, seeds and manure worth Tshs. 46,000/=, implements of Tshs. 500,000/=, buildings worth Tshs. 15,500,000/=, and purchases animal feed worth Tshs. 45,000/=. Mr Mapato had not yet paid a loan of Tshs. 300,000/=

which he obtained from CRDB Bank and Mr Nanga had not yet paid Mr Mapato Tshs. 80,000/=, 2 goats which he bought on credit. The question tested the candidates' ability to prepare financial records.

A total of 5,960 (88%) candidates attempted this question, and their scores were as follows: 2,046 (34.3%) scored from 0 to 2.5 marks; 2,438 (40.9%) scored from 3 to 6 marks and 1,476 (24.8%) scored from 6.5 to 10 marks. The general performance of the candidates on the question was good. Figure 5 summarizes the candidates' performance on this question.
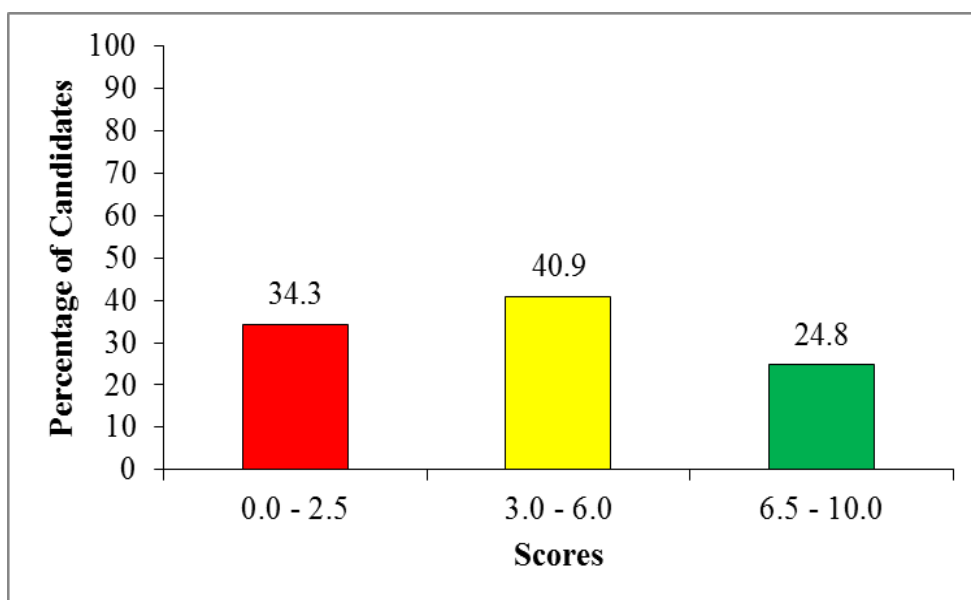


**Figure 5:** *Distribution of Candidates' Scores on Question 4*

Figure 5 denotes that the majority of the candidates (65.7%) scored from 3 to 10 marks, while 34.3 per cent scored from 0 to 2.5 marks. The analysis shows that the candidates with good performance on the question correctly prepared the balance sheet of the farm by presenting the layout of the balance sheet, containing the correct entries in the two columns. Furthermore, the candidates summed up the data in each column (liability and asset) and balanced the figure to get net profit. The candidates demonstrated adequate skills in preparing the balance sheet. Extract 2.1 represents one of the correct responses to the question.

**4.**

MR. MAPATO's FARM

BALANCE SHEET AS AT 30th March 2016

| LIABILITIES | AMOUNT | ASSETS | AMOUNT |
|---|---|---|---|
| Creditors | | Cash in hand | 200,000 l= |
| CRDB | 300,000 l= | Cash in bank | 4000,000 l= |
| | | | |
| Net profit | 27,321,000 l= | Valuation. | |
| | | 20 cattles @ 200,000 l= | 4,000,000 l= |
| | | 130 sheeps @ 25,000 l= | 3,250,000 l= |
| | | | |
| | | Seeds and manure | 46,000 l= |
| | | | |
| | | Implements | 500,000 l= |
| | | | |
| | | Buildings | 15,500,000 l= |
| | | | |
| | | Animal feeds | 45,000 l= |
| | | | |
| | | Debtors | |
| | | mr. Nanga | 80,000 l= |
| | 27,621,000 l= | | 27,621,000 l= |

**Extract 2.1:** *A sample of the correct responses to Question 4*

Extract 2.1 shows that the candidate managed to prepare the balance sheet of Mr Mapato's farms as at 30th march 2016.

The question had 40.9 per cent of the candidates with average performance. On the one hand, most of them presented correct layouts of the balance sheet, but they included a few incorrect entries in Liabilities and Assets. For example, CRDB Bank as the creditor was entered in the asset side and Mr Nanga as a debtor was entered in the liabilities' side. Consequently, the incorrect entries resulted in incorrect balanced figures and incorrect net profits.

On the other hand, 34.3 per cent of the candidates scored low marks. These failed to prepare a balance sheet of the farm. Most of them listed the farm

assets as they were preparing an inventory and valuation of the farm assets. In some cases, they prepared layouts of a profit and loss account, with income and expenditure sides, instead of the balance sheet with liabilities and assets' sides. This shows that they lacked mathematical skills and knowledge of preparing the financial position of the farm. Extract 2.2 is illustrative.

| Cr | | | | | | Dr | |
|---|---|---|---|---|---|---|---|
| 4 | Ammount | folio | particular | Ammount | Folio | Particular | |
| | 200,000 | 1 | Cash | 4000000 | 2 | Cattles | |
| | 4,000,000 | 1 | Cash | 1000000 | 3 | Sheep | |
| | | | | 46000 | 4 | Seed and manure | |
| | | | | 500,000 | 5 | Implements | |
| | | | | 1550000 | 6 | buildings worth | |
| | | | | 45,000 | 7 | Purchases | |
| | | | | 300,000 | 8 | loan | |
| | | | | 80,000 | 9 | Goats | |
| | 9200,000 | | | | | | |
| | | | | | | | |

**Extract 2.2:** *A sample of the incorrect responses to Question 4*

Extract 2.2 shows that the candidate failed to address the requirements of the question. The candidate failed to prepare the layout of the balance sheet; hence, he/she included incorrect entries.

### 2.2.3 Question 5: Dairy Cattle Farming

The candidates were required to briefly explain five measures to increase the production of milk in Tanzania in a situation where milk supply from small scale producers to dairy industries does not meet the demands of the industries. The question tested the candidates' understanding of dairy cattle production.

The question was attempted by 6,734 (99.4%) of the candidates. Among them 905 (13.4%) scored from 0 to 2.5 marks; 3,097 (46%) scored from 3 to 6 marks and 2,732 (40.6%) scored from 6.5 to 10 marks. The general performance on the question was good. Figure 6 presents the distribution of candidates' scores on the question.
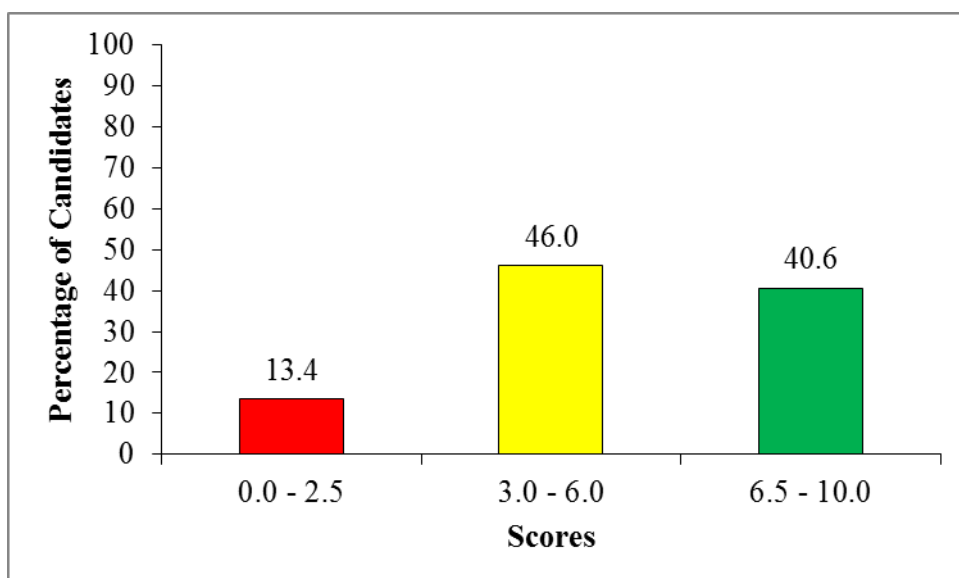
**Figure 6:** *Distribution of Candidates' Scores on Question 5*

Figure 6 depicts that 86.6% per cent of the candidates scored from 3 to 10 marks, and 13.4 per cent scored from 0 to 2.5 marks. The analysis indicates that 40.6 per cent of the candidates performed well. These correctly explained the measures to be taken to increase milk production. For example, some of the responses given by the candidates were *farmers should be given education on good cattle husbandry, distributing suitable breeding stock among dairy cattle keepers, improve pasture for dairy cattle, controlling parasites and diseases* and *provision of good housing to the cattle*. Such responses imply that these candidates had a good understanding of the concept of dairy cattle farming, specifically of the measures to be taken to increase milk production. Extract 3.1 is illustrative.

**Extract 3.1:** *A sample of the correct responses to Question 5*

Extract 3.1 are the responses that show the candidate's adequate knowledge of dairy cattle farming.

However, some candidates faced challenges in responding correctly to all measures required; hence they scored average marks. These candidates were incompetent in dairy cattle farming, particularly in the measures to improve milk production,

The candidates who scored low marks (0-2.5) on this question provided incorrect responses such as *allow calve to breed, prepare the milking material such as bucket, preparation of cow during milking, control pest, give cow plenty of water before milking, and provision of medicine*. In addition, some of them outlined characteristics of dairy cattle such as *large udder, wedge shaped body, big vein, the breed which are resistance to diseases and long lactation period*. Some of them did not understand the

question. They provided the products of milk such as *butter, fat, yoghurt, cheese* and *ghee*, instead of the necessary measures to improve milk production as, Extract 3.2 shows.



**Extract 3.2:** *A sample of the incorrect responses to Question 5*

In Extract 3.2, the candidate failed to address the demand of the question since he/she lacked knowledge of and skills in dairy cattle farming.

### 2.2.4 Question 6: Cropping Systems and Planting Patterns

The question required the candidates to (a) briefly describe two types of interplanting cropping systems practised by farmers in Tanzania and (b) give four points to convince farmers to practise interplanting instead of mono-cropping system. The question examined the candidates' knowledge of cropping systems.

A total of 6,692 (98.8%) of the candidates attempted this question. Their scores were as follows: 2,300 (34.4%) scored from 0 to 2.5 marks; 2,821 (42.1%) scored from 3 to 6 marks and 1,571 (23.5%) scored from 6.5 to 10

marks. Their general performance on the question was good.    Figure 7 shows the distribution of candidates' scores on the question.
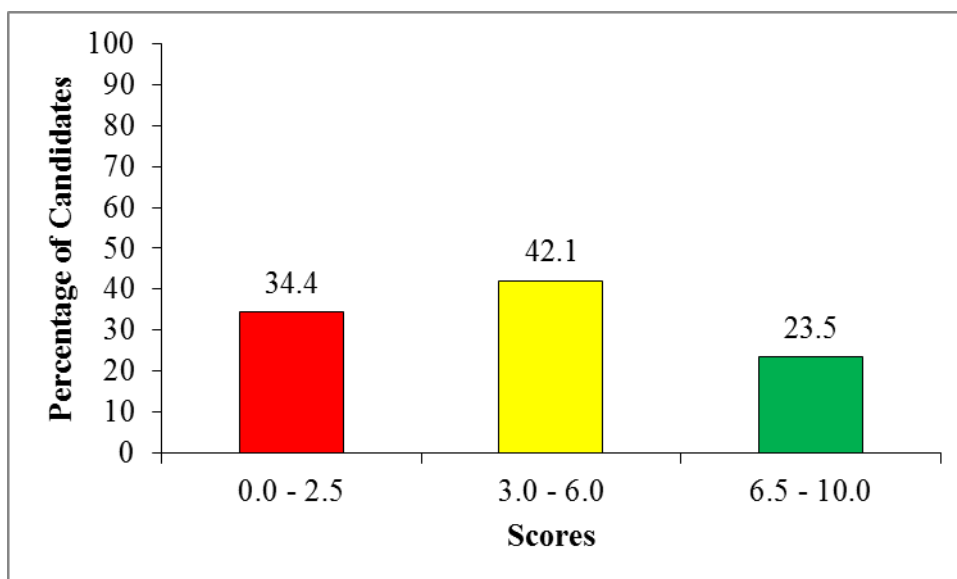


**Figure 7:** *Distribution of Candidates' Scores on Question 6*

Figure 7 indicates that the majority of the candidates (65.6%) scored from 3 to 10 marks, whereas 34.4 per cent scored from 0 to 2.5 marks. The analysis shows that 23.5 per cent of the candidates who scored high marks (6.5-10) correctly attempted nearly both parts of the question. In part (a), they correctly explained intercropping and mixed cropping as the two types of interplanting systems. For example, some of the candidates' responses were *mixed cropping involves the planting of different types of crops randomly in the field* and *inter-cropping is the growing of different types of crop in a specific and systematic pattern*. This implies that they had a good understanding of the meaning and types of interplanting systems. Consequently, in part (b), they argue for the use of interplanting instead of monocropping by giving the advantages of interplanting. Those includes *encourage nitrogen fixation, provide means of diversification* and *it help to control soil erosion*. Such responses suggest that the candidates possessed sufficient knowledge of and skills in interplanting cropping systems as illustrated in Extract 4.1.

6. a) (i) Mixed cropping is the cropping system which involve growing of more than one type of crop on the same field randomly with no correct spacing. This method involve broadcasting planting pattern where crops are grown randomly.

(ii) Inter cropping is the cropping system which involve growing of more than one type of crop on the same field in rows with correct spacing.

b) (i) Interplanting helps to provide diversification in production. When one crop fails to produce high production the other crop produce the require production. Hence the farmer do not get total loss but profit from another crop.

(ii) Interplanting helps to improve soil fertility. When legume crops are included in the field the fertility increases. Because legume crops have the ability of nitrogen fixation hence increase nutrients in the soil.

(iii) Interplanting interfere spread of pest and diseases. Different pest and disease attack a certain crops. Hence since crops are planted of different types crop pest and diseases is minimized. Example pest of maize cannot attack beans.

(iv) Interplanting helps to crop control weeds and soil erosion. When the cover crops like pumpkins is included in the field the growth of weeds is suppressed. Also soil erosion is also minimized since rain drops cannot reach the soil surface easily due to total coverage of soil

(v) Interplanting increases total yield per area.

**Extract 4.1:** *A sample of the correct responses to Question 6*

In Extract 4.1, the candidate provided the correct responses to both parts of the question, showing a good mastery of the subject matter.

However, most of the candidates who scored average marks (3-6) provided correct responses to part (a), but they did not exhaust all the points in part (b) in convincing the farmers to adopt the interplanting cropping system instead of the monocropping system.

Conversely, the candidates who had weak performance responded incorrectly to both parts of the question. In part (a), their responses were based on the methods of sowing seeds, classification of plants based on their life cycles and types. They failed to describe the two types of interplanting cropping systems. Some of the incorrect responses given by the candidates were *broadcasting is a pattern of cropping where by seed are scattered and row cropping is a pattern where by seed are planted in a specific distance, monocropping and monoculture, annual crop is a crop which complete their life cycle within one year and biannual crops complete their life cycle within two years and arable farming system is the growing of crops and mixed farming is keeping livestocks and growing crops.* This shows that they lacked knowledge of interplanting cropping systems. Accordingly, they failed to identify the two types of interplanting systems.

In part (b), most of them failed to convince farmers to practise interplanting instead of mono-cropping. They provided incorrect responses such as *easy to practiced, it increase pest and disease, provide food, provide money, it cause loss of soil fertility, it cause soil erosion* and *it destroy microbial organism.* This implies that the candidates had inadequate knowledge of and skills in cropping systems and planting patterns. Extract 4.2 is illustrative.

| | |
|---|---|
| 6 a) | |
| i) Row Intergrow cropping: This means that there no are spacing between one plant to anoth er plant or seed to another seed | |
| ii) Row cropping: This means that there are spacing between one seed to another seed | |
| | |
| b) i) I would convice them to use crop rotation instead of monocropping system; This means that to support the farmers grow crops | |
| ii) I would convice them to use more than one types of crops; this means that where the farmers grow crops | |
| iii) I would convice them to use mono culture system instead of monocropping thems system; This is due to farmers grow the crops | |
| iv) I would convice them to add the manure and use the good crop which cover the soil; this means where the farmer grow crops | |

**Extract 4.2**: *A sample of the incorrect responses to Question 6*

Extract 4.2 shows that the candidate incorrectly attempted the question. In part (a), the candidate failed to identify the two types of interplanting cropping systems, and in part (b), he/she incorrectly preferred the use of crop rotation to the interplanting cropping systems.

### 2.2.5 Question 7: Soil and Water Conservation

The question required the candidates to suggest five physical soil erosion control measures that may be adopted by farmers to minimize the risk of soil erosion in sloping areas. The question assessed the candidates' knowledge of and skills in controlling soil erosion.

The question was attempted by 6,731 (99.3%) of the candidates. Among them, out of which 2,646 (38.9%) scored from 0 to 2.5 marks; 3,115 (46.2%) scored from 3 to 6 marks and 970 (14.9%) scored from 6.5 to 10

marks. Their general performance on the question was average. Figure 8 presents the distribution of the candidates' scores on the question.
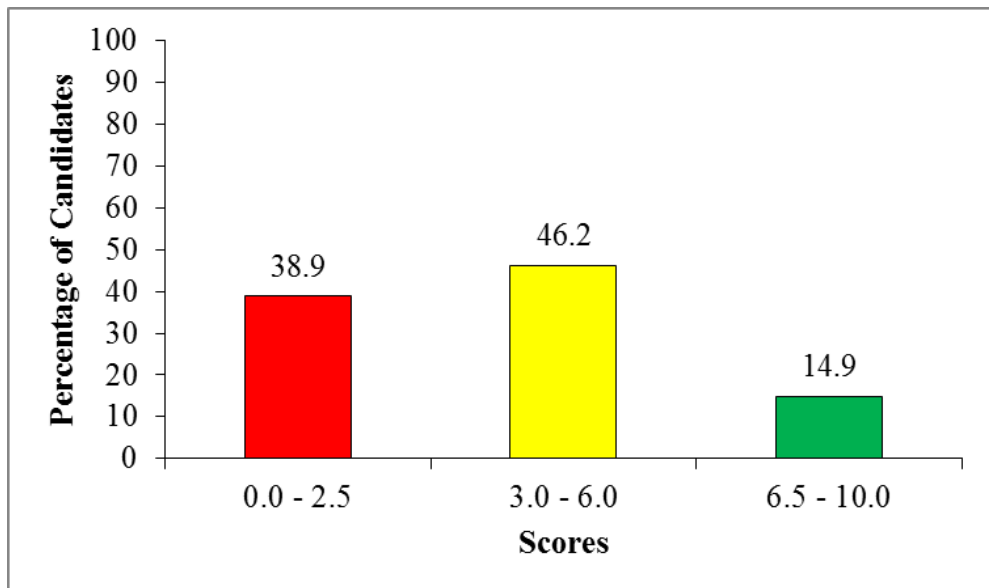


**Figure 8:** *Distribution of Candidates' Scores on Question 7*

Figure 8 illustrates that 61.1 per cent of the candidates scored from 3 to 10 marks and 38.9 per cent scored from 0 to 2.5 marks. The question had 14.9 per cent of the candidates with good performance. Their responses reveal that most of them responded correctly to the question. They correctly suggested physical soil control measures that may be adopted by farmers to minimize the risk of erosion in sloping areas. Those include *stone lines, mulch, contour farming, the use of cover crops, ridging* and *terraces*. The candidates possessed a good mastery of the practices used to control erosion in sloping areas. Extract 5.1 is a sample of the correct responses to the question.

**Extract 5.1:** *A sample of the correct responses to Question 7*

In Extract 5.1, the candidate correctly provided measures for controlling soil erosion areas. This indicates their good mastery of the subject matter.

Further analysis revealed that most of the candidates with average performance on the question suggested few points regarding the control measures that may be adopted by farmers to minimize the risk of erosion. Hence, they had inadequate knowledge of and skills in soil conservation in sloping areas.

Conversely, 38.9 per cent of the candidates had weak performance. Most of them failed to suggest the measures to minimise soil erosion in sloping areas. Examples of their incorrect responses were *avoid over grazing, avoid human activity, crop rotation, avoid burning of the vegetation, control high speed of water movement, preparation of land* and *deforestation*. Most of these are general soil erosion control measures. In addition, some of the candidates provided agronomic methods of controlling soil erosion such as *cover crops, mulching, minimum tillage, vegetative buffer strip and contour*

*strip cropping* instead of the physical soil control measures. This indicates that they lacked knowledge of and skills in controlling soil erosion in sloping areas. Extract 5.2 is an example of the incorrect responses to the question.



**Extract 5.2:** *A sample of the incorrect responses to Question 7*

In Extract 5.2, the candidate wrote the activities that can cause erosion instead of suggesting physical soil erosion control measures. The candidate lacked knowledge of and skills in controlling erosion.

### 2.2.6 Question 8: Methods of Improving Soil Fertility and Productivity

The question required the candidates to propose five suitable agronomic practices to be adopted by the school in order to replenish the soil fertility in the school farm. The question tested their knowledge of and skills in replenishing soil fertility.

The question was attempted by 6,683 (98.6%) of the candidates. Among them, 1,212 (18.1%) scored from 0 to 2.5 marks; 3,498 (52.4%) scored from 3 to 6 marks and 1,973 (29.5%) scored from 6.5 to 10 marks. Their performance on the question was good, as shown in Figure 9.
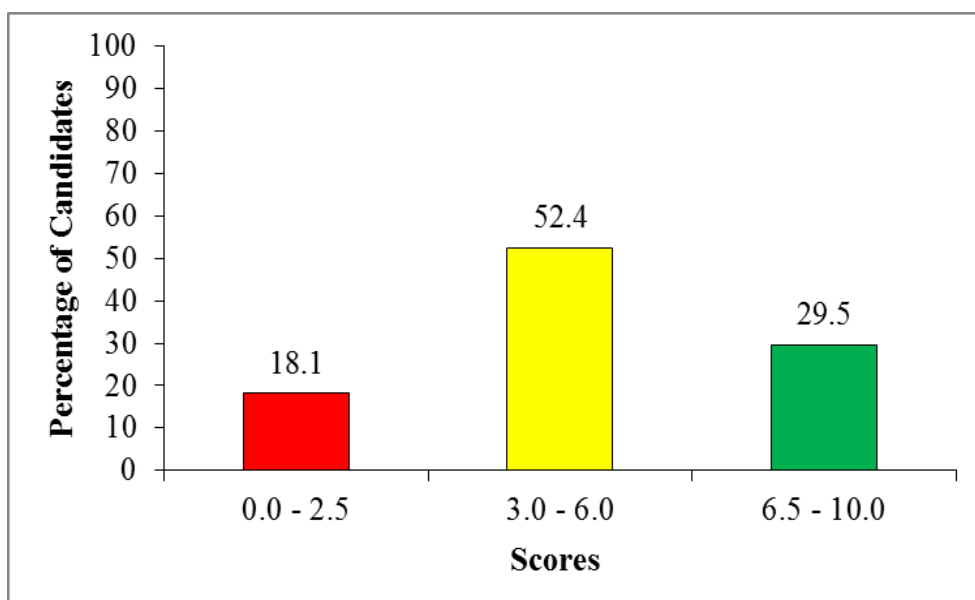
**Figure 9**: *Distributions of Candidates Scores on Question 8*

Figure 9 shows that the majority of the candidates (81.9%) scored from 3 to 10 marks and 18.1 per cent scored from 0 to 2.5 marks. Data analysis shows that 29.5 per cent of the candidates who had good performance correctly proposed suitable agronomic practices to be adopted by the school to replenish soil fertility in the farm. For example, some of the responses given by the candidates were *crop rotation, control soil erosion, controls of weed, minimum tillage, mulching* and *use of cover crops.* These responses suggest that the candidates had adequate knowledge of and skills in replenishing soil fertility. Extract 6.1 is a sample of the correct responses to the question.

**Extract 6.1:** *A sample of the correct responses to Question 8*

In Extract 6.1, the candidate demonstrated a good understanding of the agronomic practices used to replenish soil fertility.

Furthermore, analysis indicates that more than a half (52.4%) of the candidates scored average marks. Most of them managed to propose agronomic practices that are used to replenish soil fertility. They performed averagely because they did not completely explained how the practices influence soil fertility. This shows that they had insufficient knowledge of and skills in improving soil fertility and productivity.

Nevertheless, 18.1 per cent of the candidates attained weak performance. Most of them failed to propose the agronomic practices recommended to replenish soil fertility. For example, some of the candidates wrote *deforestation, flooding, leaching process, poor climatic condition, outbreak*

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*of pest and diseases, low science and technology* and *overgrazing*. However, some of them provided ways in which the soil looses its fertility, such as *leaching, soil erosion, harvesting of crops, flooding* and *monoculture* instead of the agronomic practices that are used to replenish soil fertility. Their responses show that the candidates lacked knowledge of and skills in the agronomic practices used to replenish soil fertility. Examples of the incorrect responses to the question are shown in Extract 6.2.



**Extract 6.2:** *A sample of the incorrect responses to Question 8*

In Extract 6.2, the candidate proposed practices that cause loss of soil fertility instead of the practices that replenish soil fertility.

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## 2.2.7 Question 9: Agricultural Development in Tanzania

The question required the candidates to examine five problems facing the agriculture industry in Tanzania. The question tested the candidates' understanding of the basic problems facing the agriculture sector in Tanzania.

The question was attempted by 6.764 (99.4%) candidates, whose scores were as follows: 422 (6.2%) candidates scored from 0 to 2.5 marks; 2,706 (40%) scored from 3 to 6 marks and 3,636 (53.8%) scored from 6.5 to 10 marks. Their general performance on the question was good. Figure 10 shows the distribution of candidates' scores on the question.
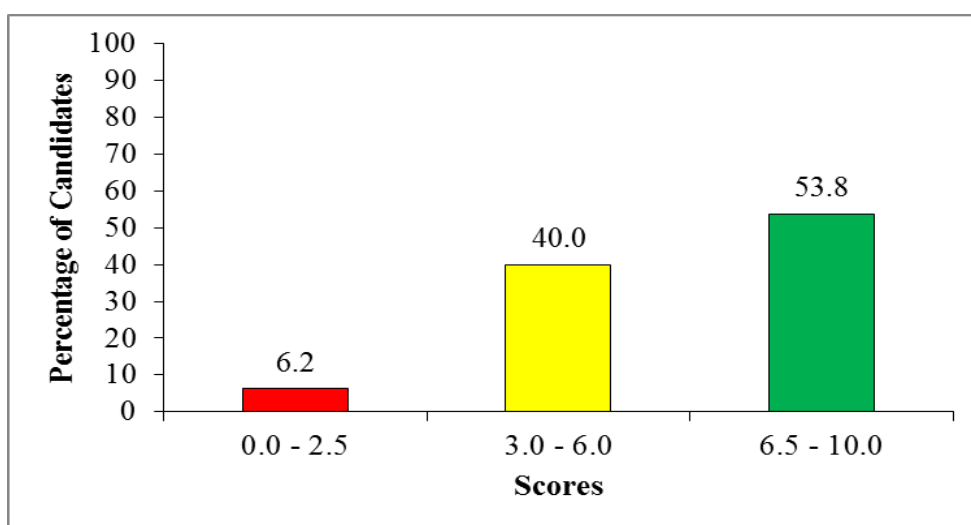


**Figure 10:** *Distribution of Candidates Scores on Question 9*

Figure 10 indicates that the majority of the candidates (93.8%) scored from 3 to 10 marks, while 6.2 per cent scored from 0 to 2.5 marks. The statistics indicate that 53.8 per cent of the candidates performed well on the question. Most of them managed to examine problems facing the agriculture industry in Tanzania. They provided problems such as *poor crop and animal husbandry, poor storage facilities, risks and uncertainty, poor transportation system, pests and diseases* and *poor market facilities*. The responses provided imply that the candidates were knowledgeable about the basic problems facing the agriculture industry in Tanzania. Extract 7.1 is a sample of the correct responses to the question.

9. i) Shortage of enough capital.
- Capital means money required to be used in different issues such as buying different raw materials needed in Agriculture and buying other things such as chemicals to control parasites which attack animals like cattles.

ii) Shortage of storage facilities.
- Storage facilities which are found in Tanzania and which are used in agriculture are so poor and are not enough and hence this is one among the big problem which affect Agriculture in Tanzania.

iii) Poor knowledge among the farmers.
- Knowledge means skills which are required to be used in different issues example keeping of animals and cultivation of crops is so poor among the producers.

iv) Poor m tools used in production.
- Tools means modern instruments which are needed to be used in production activities so many of the people are using hand hoe in production.

v) Shortage of markets.
- Market is the place where goods are sold and bought so the markets found in Tanzania are so small that can not be able to buy all the products produced and hence some goods be sold at low price.

**Extract 7.1:** *A sample of the correct responses to Question 9*

Extract 7.1 shows how the candidate was precise in explaining the problems facing the agriculture industry in Tanzania.

Data analysis specifies 40 per cent of the candidates scored 3 to 6 marks on this question. Most of them provided few problems facing the agriculture industry in Tanzania. Some of the candidates even provided responses which lacked a logical flow or address the demand of the question.

However, 6.2 per cent of the candidates who attained weak performance on this question failed to examine the problems facing the agriculture industry in Tanzania. Analysis reveals that most of them provided incorrect responses, such as *lack of labour, lack of employment, shortage of parasite and diseases, lack of land, lack of raw material* and *poor management of entrepreneur.* Some candidates explained problems facing agricultural marketing. These included *bulkiness, seasonality, perishability*, *lack of marketing information* and *taxation*. Instead, they were supposed to focus on the problems facing agriculture in Tanzania. Furthermore, some candidates mentioned the basic problems facing farmers like *economic factors, climatic factors, social factors* and *institutional factors,* without elaborating them, as shown in Extract 7.2.

**Extract 7.2:** *A sample of the incorrect responses to Question 9*

In Extract 7.2, the candidate incorrectly explained some of the activities involved in agriculture.

## 2.3 SECTION C: Essay Questions

### 2.3.1 Question 10: Soil Reactions

The question required the candidates to explain six significant considerations when conducting the soil pH test in crop production. The question assessed the candidates' knowledge of importance of the soil pH.

The question was done by 4,106 (60.6%) of the candidates. Among them, 1,662 (40.5%) scored from 0 to 4 marks; 1,846 (44.9%) scored from 4.5 to 9.5 marks and 598 (14.6%) scored from 10 to 15 marks. Their general performance on this question was average, as in Figure 11.
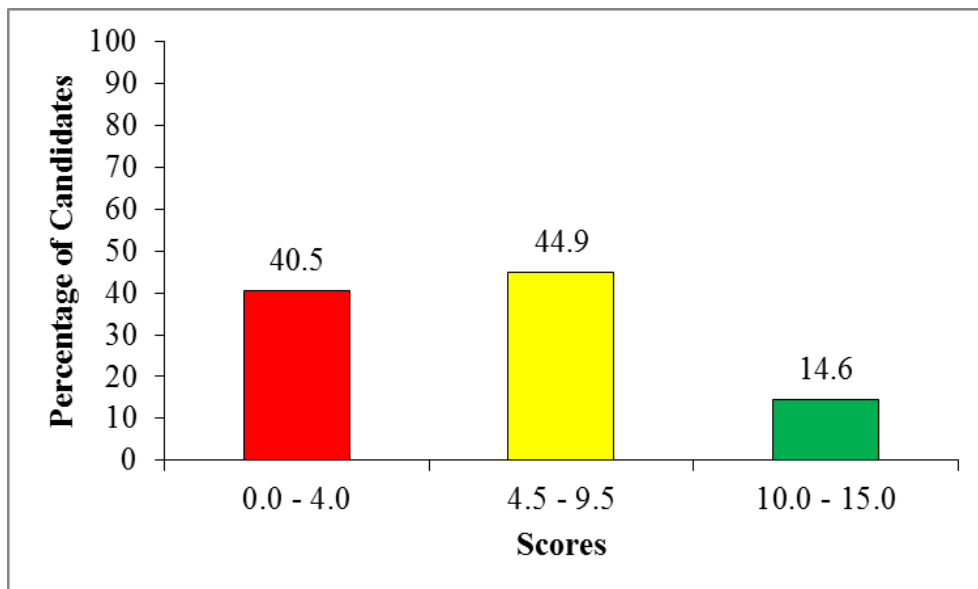


**Figure 11:** *Distribution of Candidates Scores on Question 10*

Figure 11 shows that 59.5 per cent of the candidates scored from 4.5 to 15 marks, and 40.5 per cent scored from 0 to 4 marks. The analysis revealed that 14.6 per cent of the candidates attained good performance on the question. The majority of them correctly explained the significance of conducting the soil pH test in crop production. Their responses signify that they understood the importance of testing soil pH. For example, some of their key points were *determines availability of plant nutrients, help to estimate soil amendments needed, it influences microbial organism* and *selection of suitable crops.* Furthermore, the candidates demonstrated good essay-writing skills. They organised well the ideas in the main bodies and developed good introductions and conclusions. This enabled them to score high marks on the question. Extract 8.1 is an example of the correct responses to this question.

10. Soil pH is the negative logarithm of hydrogen ion concentration in the soil. Ad And the soil pH test is conducted by pH scale which enable a farmer to determine the acidity or alkalinity of the soil.

The following are the significance of considering conducting the test in crop production.

It help a farmer to determine the type of crop to be grown in a certain area. Also through conducting soil pH test a farmer can be aware on degree of acidity or alkalinity of on area and also can determine the type of crop to be grown.

It affect solubility of different element in the soil. Also by conducting soil pH test a farmer can be aware on solubility of different in the soil

It affect activities of microbial organism. Also through conducting soil pH it can affect the activities of microbial organism in the soil

It affect the availability of different nutrient in the soil. Also some of soil nutrient such as Nitrogen, potassium and phosphorus can be affected by conducting soil pH test in crop production.

| | | |
|---|---|---|
| 10. | It help to determine the ammendment to be done in the soil. Also through conducting soil PH test it can help the farmer to be aware on the ammendment to be done so to improve crop yield. | |
| | It help to determine audity and alkalinity of the soil. Also through conducting soil PH test it can help to know audity and alikalinity of on area. | |
| | So a farmer should conducting soil PH test in the area before starting to produce in order to know preferable soil and crop for his or her production. | |

**Extract 8.1:** *A sample of the correct responses to Question 10*

Extract 8.1 indicates that the candidate possessed good essay writing skills. He/she explained the significance of conducting the soil pH test.

A total of 1,846 candidates equivalent to 44.9 per cent of the candidates, scored average marks on this question. The majority of them provided correct responses on the significance of conducting a soil pH test, but they did not provide all the points demanded by the question. Another challenge was that some candidates listed the significance but failed to organise the concepts and explain in detail.

Conversely, 40.5 per cent of the candidates attained weak performance on the question. Most of these candidates failed to explain the significance of conducting soil pH tests in crop production. Examples of the incorrect responses include *it determines amount of rainfall, it reduce soil erosion, it control pest and disease, it determine the various commodities, it conserve moisture content* and *it help to soil drainage*. Moreover, some of the candidates explained the importance of soil like *home of soil microorganism, it supports the growth of plant, it stores water and nutrient elements needed for plant growth* instead of significance of conducting soil pH tests. Besides providing incorrect responses, most of them had poor essay writing skills. They failed to develop good introductions, main bodies or conclusions which resulted in the loss of marks. This signifies that they

lacked knowledge of the significance of conducting soil pH tests in crop production. Extract 8.2 is a sample responses.



**Extract 8.2:** *A sample of the incorrect responses to Question 10*

In Extract 8.2, the candidate misinterpreted the demand of the question by explaining the importance of crop production instead of the significance of

conducting the soil pH test. The candidate also exhibited poor essay writing skills.

### 2.3.2  Question 11: Principles of Livestock Production

The question required the candidates to suggest six principles of animal breeding to be adopted by farmers to improve performance of farm animals. The question examined the candidates' knowledge of livestock breeding.

The question was opted by 2,570 (37.9%) of the candidates. Their scores were as follows: 1,462 (56.9%) scored from 0 to 4 marks; 706 (27.5%) scored from 4.5 to 9.5 marks and 402 (15.6%) scored from 10 to 15 marks. The general performance of the candidates on the question was average. Figure 12 depicts the distribution of candidates' scores on the question.
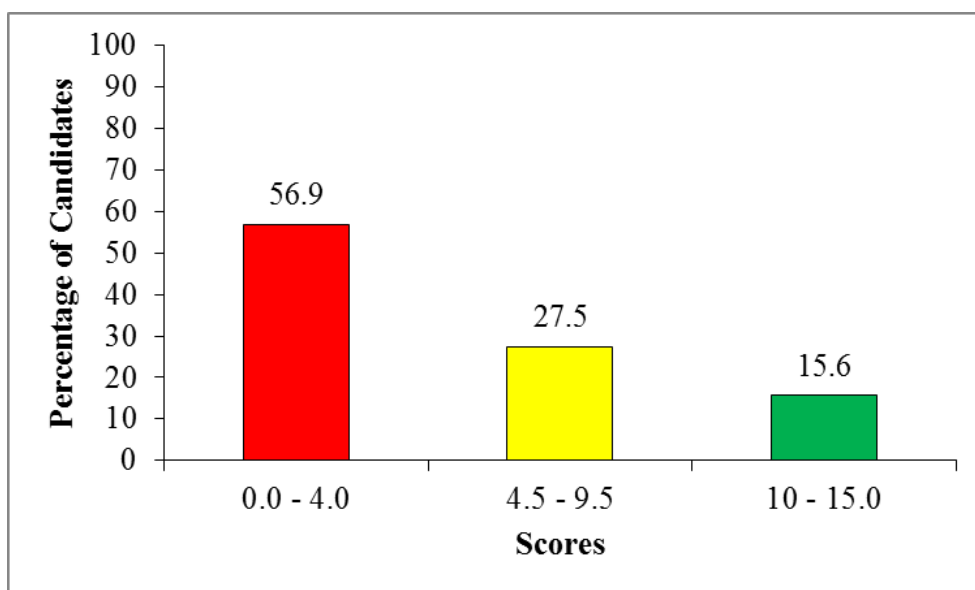


**Figure 12:** *Distribution of Candidates Scores on Question 11*

Figure 12 shows that 43.1 per cent of the candidates scored from 4.5 to 15 marks whereas 56.9 per cent scored from 0 to 4 marks.

Most of the candidates who scored high marks (10-15) correctly suggested the principles of animal breeding to be adopted by farmers to improve the performance of farm animals. Another competence shown by the candidates involved good essay writing skills, which enabled them to organise their ideas and present them clearly. For example, some of the principles given by the candidates were *selection of the breeding stock, care of young animal,*

*castration of male animal, breeding at proper age* and *use of appropriate breeding system*. This signifies that the candidates were knowledgeable about the principles of animal breeding, as shown in Extract 9.1.

| | |
|---|---|
| 11. | Livestock breeding the is a process that involve mating of farm animals incor der to produce new Offspring the livesto ck breeding mostly is done in order too Improve the performance of the farm animals for the successful breeding in the flock of the farm there is some of principles that must be adopted and considered by the farmers as follows; Selection of farm animal with desirable, proper and qualified traits when breeding only the farm animal with desirable traits should be included in or der to avoid unwanted and less pro ductive breeds of livestock forexample breed of cattle with less milk or with low butter fat content in it. Breeding at proper Age, the age of an animal is among of the things which must be considered the farm animal must breeding must not be do ne when the animal is too young or too old but at age of mid so that the offspring produced should be healthy and strong. Breeding by right method, the breeding method must be considered as in such there is a heifer with small body it is recommended to use the artificial Insermination method so that the heavy bull may not injer and crush those heifer with small bodies |

11. Rams mating or most of bulls and large heavy and heavy weight.

Breeding at proper time, the time of breeding depends on what time does the cow or the heifer has shown the signs of heat, if the cow has shown signs of heat in the morning the breeding is best done in evening and if in evening is best done in morning this means twelve hours after signs of heat.

Ensure there is caring of pregnant animals and young animals after birth the pregnant animals should be provided with balanced ration every day so that foetus grow very well and after giving birth the young animals should get colostrum from the mother to develop body antibodies and also the digesting of nutrients and feed.

Consider the Castration and Culling of some farm animals, some of farm animals are either castrated or culled from the farm due to low productivity, Infertility of that farm animals also may be culled due to the presence of pests and diseases, therefore the farmer must practice there where necessary in order to facilitate the production of good quality products

11. The livestock breeding is done for different purposes such as to Improve the breeds of farm animal, to replace a certain breed by another by practising upgrading and also in order to preserve the same characteristics of parent animals.

**Extract 9.1:** *A sample of the correct responses to Question 11*

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Extract 9.1 shows that the candidates had good essay writing skills. Hence, he/she correctly suggested and explained the principles of animal breeding.

Analysis indicates that 27.5 per cent of the candidates had average performance on this question. Most of them correctly developed introductions and conclusions in their essays. However, besides managing to organise the ideas in the main body, they did not exhaust all the required correct responses.

Conversely, 56.9 per cent of the candidates attained weak performance. Most of them provided incorrect responses in the main body or failed to develop appropriate introductions and conclusions. Examples of the incorrect responses in the main body on the principles of animals breeding were *choose an animal which is free from diseases, choose animal which are marketable, select an animal which produce a lot of milk* and *animal feed should be available*. In addition, some candidates provided breeding methods such as *line breeding, out breeding, upgrading, cross breeding* and *inbreeding* instead of the principles of animal breeding. Furthermore, some candidates provided principles of livestock production like *control of parasites and diseases, good housing, skillful handling of animals* and *proper feeding* instead of the principles of animal breeding. All these responses suggest that the candidates were not familiar with the principles of animal breeding. Extract 9.2 is an example of the incorrect responses to the question.

| | | |
|---|---|---|
| 11 | Livestock breeding is the process of keep ing animal for difference purpose either for Meat, whole production of selling It enable peop le when dealing with that activities to have ing enough Money in the country. The following is the principle of animal breeding to be follow ~climatic factors Refer when people who nting to keeping the large number of an imal should have enough knowlge on how to controlling the pest and disease whenw ill occure in the area. Health of the animal. It very importance to identify thay health of animal in order to avoiding the spreading of disease in lar ge amount to that place which all ani mal are present. Feed eaten by animal. It very important to identify the specific feed which anim al thay like to eating them with high amount in order to growing well in thae area. The keeper should have knowlge. Refer when the keeper having enough knowlge it can easly to controlling the pest and diseases in the specific area which thay keeping anim al in order to get Meat. presence of Medicines. It very important to having Medicine in order if thay fern ed the one animal having diseases it c an easly to preventing the infection to each other which thay live to gether. | |

| | | |
|---|---|---|
| 11 | Breeding of animal should be docile. It e nable the keper to having the enough anim al which does not causing many effecting to them. It very importance every keeper to having knowlge. conclution, livestock refer to the keep ing difference animal for the main purpose in the community which formed in thesp esifit area. It very enable to selecting the animal which have strong health. | |

**Extract 9.2:** *A sample of the incorrect responses to Question 11*

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Extract 9.2 shows that the candidate had a misconception. Hence, he/she provided incorrect responses in the main body. He/she also failed to introduce and conclude the essay properly.

## 2.4 034/2 AGRICULTURAL SCIENCE 2

### 2.4.1 Question 1: Soil and its Agricultural Utilization

The candidates were provided with the following specimen, apparatti and materials: **A** (Urea), **B** (Calcium Ammonium Nitrate), **C** (Sulphate of Ammonia), D (Agricultural lime), **Q** (Distilled water in beaker), A test tube rack, test tubes, a spatula, a marker pen, masking tape, blue litmus paper, red litmus paper and a stop watch/wall clock. They were required to perform the following procedures and answer the questions that follow.

**Procedure**
(i)    Observe each of samples **A**, **B**, **C**, and **D** and record their colour and shape.
(ii)   Using a spatula, place a small quantity of each sample in the different test tubes provided and label the test tubes as **A**, **B**, **C** and **D** as per the sample placed respectively
(iii)  Add distilled water (labelled **Q**) in each sample in the test tube and shake the mixtures vigorously.
(iv)   Place the strip of red and blue litmus paper in the solution made from dissolved samples made in (iii) simultaneously. Wait for 30 seconds and then observe the pieces of papers.
(v)    Record your observations and find out the pH of the samples.

**Questions**
(a) Tabulate the result of the experiments based on the observation

| Sample | Color | Formulation | Action to litmus paper | pH |
|--------|-------|-------------|------------------------|-----|
| A      |       |             |                        |     |
| B      |       |             |                        |     |
| C      |       |             |                        |     |
| D      |       |             |                        |     |

(b) What will happen if sample **A**, **B** and **C** are repeatedly applied in the same piece of land? (c) Why a farmer frequently applies samples **A**, **B** and **C** in the field? (d) Suggest with a reason the best chemical to be applied in

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a soil having more of sample **A** and **C** for optimum growth of plant (e) Suggest six suitable benefits from pH results that will favour plant growth in the field when applying sample **D** and (f) Give three precautions farmers need to consider when working with chemicals **A**, **B** and **C** in the field environment. The question tested the candidates' ability to analyse physical and chemical properties of fertilizers.

The question was done by 6.776 (100%) of the candidates. Among them, 658 (24.5%) scored from 0 to 7 marks; 4,259 (62.8%) scored from 7.5 to 16 marks and 859 (12.7%) scored from 16.5 to 25 marks. The performance of the candidates on the question was good. Figure 13 indicates the distribution of candidates' scores on the question.
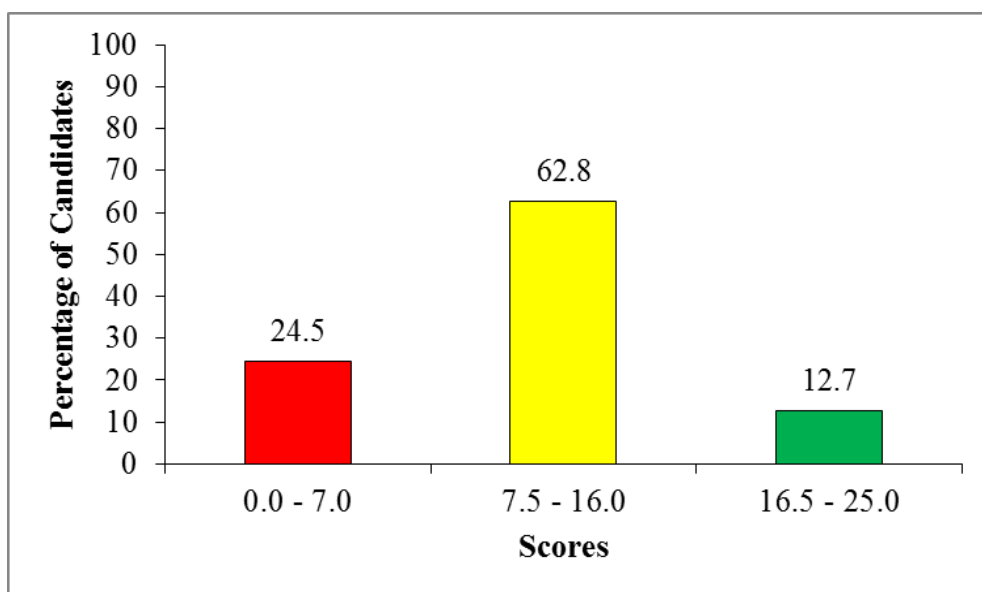


**Figure 13:** *Distribution of Candidates' Scores on Question 1*

Figure 13 illustrates that the majority of the candidates (75.5%) scored from 7.5 to 25 marks, and 24.5 per cent scored from 0 to 7 marks. The statistics showed that 12.7 per cent of the candidates' performed well on the question. The majority responded correctly nearly all parts of the question. In part (a), they correctly tabulated the results of the experiment as follows:

| Sample | Color | Formulation | Action to litmus paper | pH |
|--------|-------|-------------|------------------------|-----|
| A(Urea) | White | Granules | Turn blue litmus paper into red colour | Acidic |
| B (CAN) | Creamy/greyish /White | Granules | No action on litmus paper/no colour change | Neutral |
| C (S.A) | White | Crystalline | Turn blue litmus paper into red colour | Acidic |
| D (Agricultural Lime) | White | Powder | Turn red litmus paper into blue colour | Basic |

This suggests that the candidates had good observational skills, and they correctly followed the experimental procedures that yielded the correct results. The results enabled them to respond correctly to the questions that followed. In part (b), they correctly explained what would happen if samples **A**, **B** and **C** were repeatedly applied in the same piece of land. The responses were *Specimens A and C when repeatedly applied in the same piece of land, since they turned blue litmus into red colour (acidic), the soil will be acidic in reaction* and *Specimen B apart from being nitrogenous fertilizer will not increase soil acidity since the acidity produced by Ammonium ion is counteracted by the liming material (CaCo$_3$) hence makes it a neutral fertilizer*. This indicates that the candidates were knowledgeable about the residue effects of the named fertilizers. Likewise, in part (c), they correctly gave reason why the farmers frequently apply sample **A**, **B** and **C** in a field. *This is because the specimens have short residual effects of which this makes the nutrients it contain unavailable for the next cropping seasons*. The candidates were familiar with the duration of the residue effects of the fertilizers. In part (d), they correctly suggested and gave reason for the chemical to be applied in a soil having more of samples **A** and **C** for optimum growth of plants. The suggested chemical *was specimen D (Agricultural Lime) and the reason is that it corrects/neutralizes the acidity produced from named specimen and hence makes nutrients available for plants uptake*. This shows that the candidates

had sufficient knowledge of and skills in liming. Furthermore, in part (e), they correctly suggested benefits that will favour plant growth in the field when applying sample **D**. These include *enable survival of soil organisms, it supplies nutrients such as Calcium and Magnesium, it improves the physical properties of soil after long application, increase solubility/availability of phosphorus and molybdenum in the soil* and *it enhances microbial activity; hence it increases the decomposition of organic matter, and thereby facilitates the release of plant nutrient elements.* These responses show that the candidates had a good understanding of the importance of liming. In part (f), they gave correct precautions when working with chemicals **A**, **B** and **C** in the field environment. The precautions were *they have scorching or burning effect on plants therefore, they should not come into contact with any part of the plant particularly the foliage except for foliar fertilizer, they are hygroscopic hence tend to absorb moisture therefore tend to 'cake' (granules sticking together forming lumps). Always keep them in dry condition* and *they are highly corrosive and tend to corrode the epithelial cells lining of the palms. Therefore they should not be handled with bare hands.* Hence, the candidates were knowledgeable about important considerations when working with the fertilizers. An example of the correct responses to the question is shown in Extract 10.1.

1. a)

| Sample | Color | Formulation | Action to litmus paper | pH |
|--------|-------|-------------|------------------------|-----|
| A | White | Crystalline | It change blue Litmus paper to red and no effect in red litmus paper | slightly acid 6 - 6.9 |
| B | Grey | Crystalline | It has no effect on the red and blue litmus paper | Neutral 7.0 |
| C | White | crystalline | It change blue Litmus paper to red. It has no effect in red Litmus paper | strong acid 4 - 5 |
| D | White | powder | It change red litmus paper to red. It has no effect in blue litmus paper | Base |

b) If specimen A and C applied repeatedly in the same piece of land it cause acidic condition in the soil

And when specimen B applied repeatedly in the same piece of land it has no effect since its neutral.

1. c) A farmer apply frequently specimen A, B and C in the field because it deal with vegetative growth also it have low residue effect in the soil.

d) The best chemical to be applied in a soil having more of sample A and C for optimum growth of plants is Agriculture Lime like calcium carbonate $(CaCO_3)$, calcium hydroxide $Ca(OH)_2$, and Calcium silicate $(CaSiO_3)_2$ because it neutralize acidic condition of the soil.

e) i) It help to add some nutrient in the soil like calcium and magnesium.

ii) It help to improve soil fertility by neutralize acidic condition of the soil

iii) It help to increase yield since many crops can be grow well in the field.

iv) It help to control soil erosion and improve soil structure.

v) It help to strengthen plant tissue which is xylem and phloem when it applied correctly in the soil.

vi) It help to increase plant density by ensure well growth of plant in the field.

1. f) i) The farmer have to ensure that the chemicals are not touch plant leaves since if it touch plant leaves it cause scorch or burning of leaves. So he/she have to apply in the roots of plants.

**Extract 10.1**: *A sample of the correct responses to Question 1*

In Extract 10.1, the candidate possessed good observational and analytical skills and hence provided the correct responses.

Statistics indicate that 62.8 per cent of the candidates had average performance on the question. Most of them correctly attempted parts (a), (b) and (d) of the question, In part (c), they failed to explain why farmers frequently apply samples **A**, **B** and **C** in the field. Examples of the incorrect responses given were *to encourage growth and development of plant, to add nutrients in the soil, to obtain high yield* and *to stimulate growth of the*

*leaves hence photosynthesis*. These responses were the general functions of the given fertilizers. In part (e), they failed to exhaust the benefits of applying agricultural lime in the field. Likewise, in part (f), they gave general precautions to take when working with agrochemicals such as *avoid inhaling* and *wearing of protecting gears* instead of the precautions to take when working with the named fertilizers.

Furthermore, 24.5 per cent of the candidates had weak performance. They responded incorrectly to nearly all parts of the question. In part (a), they tabulated incorrectly the results of the experiment. One candidate gave the following:

| Sample | Colour | Formulation | Action to litmus paper | pH |
|--------|--------|-------------|------------------------|----|
| A | Urea | Acid | Blue | 9 |
| B | CAN | Acid | Blue | 3 |
| C | SA | Alkaline | Red | 7 |
| D | Gypsum | Acid | Blue | 1 |

Some candidates described the formulations of the given samples as *round, spherical, blocky*, *oval* and pH as *high, low* and *moderate*. Their responses proved that the candidates lacked observational skills. They also failed to follow the experimental steps which resulted in the wrong results. Consequently, they responded incorrectly to the question that followed. In part (b), they failed to explain what would happen if samples **A**, **B** and **C** were repeatedly applied in the same piece of land. The candidates provided collective responses such as *increase production, there is not result, white colour will occur, it produces soil fertility and it improve plant growth* and *it reduce soil acidity*. Some of these responses relate to the functions of fertilizers. This justifies the candidates lacked knowledge of the residue effects of the named fertilizers. In part (c), they incorrectly gave reasons why farmers frequently apply samples **A**, **B** and **C** in the field. Some of incorrect responses provided were *used as medicine, best chemical applied in the soil, it controls soil erosion, it controls weed* and *it reduce acid in the soil.* This suggests that the candidates had poor understanding of how long the fertilizers' nutrients remain in the soil. Similarly, in part (d), they gave the wrong reason for the chemical to be applied in a soil having more of sample **A** and **C** for optimum growth of plants. The responses provided include *for optimum availability of phosphorus, the best chemical is*

*herbicide, Calcium Ammonium Nitrate, Sulphate of ammonium* and *Barium sulphate.* Some of candidates provided types of inorganic fertilizers such as *Nitrogenous fertilizer, Phosphatic fertilizer, Potash of muriet* as chemicals that were to be applied. The reasons provided for the application of the chemical were *to increase fertility, to allow big harvest, to control diseases* and *to kill weeds*. These responses indicate that the candidates lacked knowledge about liming. In part (e), they failed to suggest benefits that would favour plant growth in a field when applying sample **D**. Examples of the incorrect responses provided include *increasing soil erosion, source of disease and pest in the soil, provide food, it is harmful to human being* and *it increase acidity in the soil.* Most of the responses provided were not benefits but effects. This signifies that the candidates did not understand that the question demanded the importance of liming. Moreover, in part (f), they gave incorrect precautions when working with chemicals **A**, **B** and **C** in the field environment. Examples are *types of crop to cultivate, should identify the pH of the soil, should also know types of soil* and *should control pest and diseases,* Other candidates pointed out safety precautions during the application of pesticides like *do not smoke when handling pesticides, avoid contact between chemical and eyes, store chemical carefully* and *use the correct dosage* instead of the precautions to take when working with the given fertilizers. The candidates lacked knowledge of the important precautions to take when working with the fertilizers. Extract 10.2 is an example of the incorrect responses in the question.

**1. a)**

| sample | colour | formulation | Action to litmus paper. | pH |
|--------|--------|-------------|-------------------------|-----|
| A | red go to blue acidic | $(NH_4)_2 CO_4$ | Urea UREA | Nitrogen |
| B | red go to blue acidic | $(NH_2)_4 SO_2$ | Can CAN | Nitrogen |
| C | red go to blue acidic | Soluphate ammonian | S.A | phosphatic |
| D | red go to blue inacidic | Limestone | LIMESTONE | Nitrogen |

**b)** A - Urea
B - CAN
C - S.A

**c)** Because have fertulitizers to improve provide in maize have lapid to the farm

**d)** Iron to chemical of growth plants

**1. e)** i) It help to provide income
It help to provide employment
It help to provide capital
It help to provide money
It help to provide Liming.
It help to provide forreign currency

**f)** i) Board planting of the farmers
ii) flooting planting of the farmers
iii) Element planting of the farmers.

**Extract 10.2:** *A sample of the incorrect responses to Question 1*

Extract 10.2 shows that the candidate lacked observational and analytical skills.

### 2.4.2 Question 2: Crop Production and Agricultural Mechanics

(a) The candidates were provided with the following specimens and chemicals: **P** (Nut grass plant), **U** (Wild finger millet plant), **T** (Star grass plant), **I** (Couch grass plant), Glyphosate and Paraquat. As plant doctors, they were required to observe carefully the given specimens and then answer the questions that followed, as indicated below:

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(i)Why was it difficult to manage specimen **P**, **U**, **T** and **I** in the crop field? (ii) Which herbicide is suitable for eradicating specimen **P**, **U**, **T** and **I**? Give a reason (iii) why the other choice of herbicide is not recommended other than the one you have chosen in (ii)? (iv) Recommend the most appropriate growth stage of specimens **P**, **U**, **T** and **I** for maximum effectiveness of the proposed herbicides. The question assessed the candidates' knowledge and skills of weeds and their control.

(b)  The candidates were provided with the following material, specimen and tool. **Z** (Copper wires), specimen **W** (Working tractor battery), **X** (Working voltmeter), spanner number 12 and 13. They were required to carry out the following procedures and then answer the questions that followed, as indicated below:

**Experiment 1**
**Procedures**
(i)  Use spanner number 12 and 13 to connect one end of each piece of material **Z** into positive and negative terminals of specimen **W**.
(ii) Connect the other ends of pieces of material **Z** into positive and negative terminals of specimen **X**: Positive to positive and negative to negative terminals.
(iii)Record what have you observed.
(iv)Proceed with Experiment 2.

**Experiment 2**
**Procedures**
(i)  Disconnect the two ends of material **Z** from specimen **X**.
(ii) Make contact of two ends of disconnected material **Z** from specimen **X**.
(iii)Record what you have observed.
(iv)After finishing the experiment, loosen and remove material **Z** using spanner number 12 and 13 from specimen **W**.

**Questions**

(i)What have you observed in both experiments? (ii) What was the aim of the two experiments? (iii) How will you care and maintain specimen **W** to make sure that the aim of the two experiments in (ii) are met? Give five points to support your answer and (iv) Give the name and function of each specimen **W** and **X**. The question tested the candidates' ability to identify faulty in the parts of the tractor engine system.

The question was done by 6,774 (100%) candidates. Among them, 2,243 (37.9%) scored from 0 to 7 marks; 4, 112 (57.5%) scored from 7.5 to 16 marks and 419 (4.6%) scored from 16.5 to 24 marks. Their performance on the question was average. Figure 14 portrays the distribution of candidates' scores on the question.
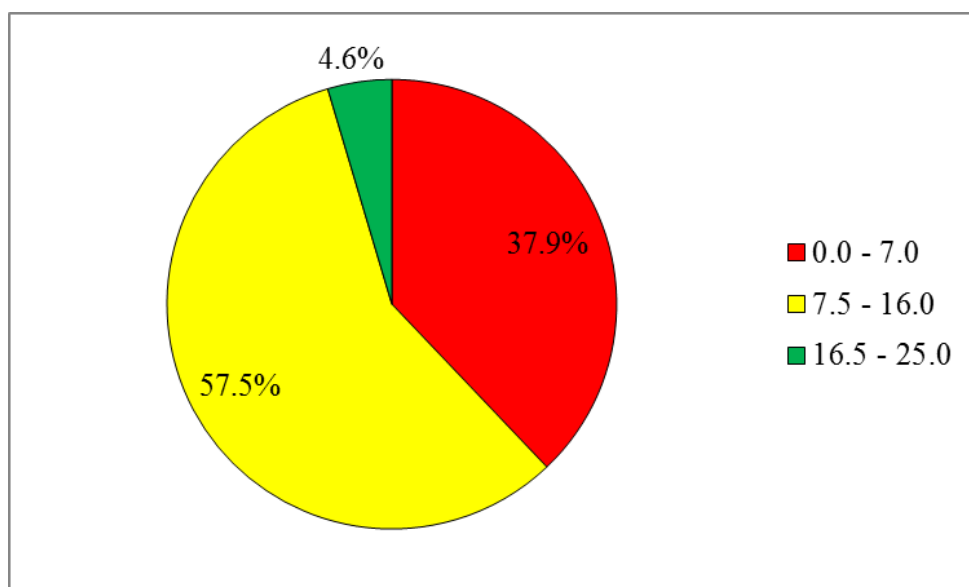


**Figure 14:** *Distribution of Candidates' Scores on Question 2*

Figure 14 shows that the majority of the candidates (62.1%) scored from 7.5 to 24 marks, while 37.9 scored 0 to 7 marks. The data show that 4.6 per cent of the candidates attained good performance on the question. The majority responded correctly to almost all parts of the question. In part (a), item (i), they adequately explained why it was difficult to manage specimens **P**, **U**, **T** and **I** in the crop field. The reason was that *specimen P (Nut grass) have underground storage structures (nuts) which exist in the soil. Such structures are very difficult for the farmer to completely uproot*

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*them from the soil. Specimen **U** (Wild finger millet) resemble finger millet (crop plant) as a result it becomes very difficult for the farmer to distinguish them, as such, the efficiency of the farmer in eradicating the weed will be lowered and it also it produces a lot of seeds which can easily be dispersed. Specimen* T *(Star grass) have creeping stems (stolon) which either penetrates deep into the ground or buried by eroded soil masses. Such structures are very difficult for the farmer to completely uproot and it also has long runners /rhizomes /stolon. Specimen **I** (Couch grass) have underground stems (rhizomes). Such structures extend very deeply into the soil such that it becomes very difficult for the farmer to completely uproot all rhizomes and it also has rhizomes /runners /underground stem /deep roots*. These responses show that the candidates had a good understanding of the difficulties in controlling grass weeds. In item (ii), the candidates correctly named the herbicide which is suitable for eradicating specimens **P**, **U**, **T** and **I**. The herbicide was *(Glyphosate/Round up) because this is a translocate (systemic) herbicide. The herbicide is absorbed through the tissues hence killing the weeds by inhibiting an enzymes present in it*. This indicates that the candidates were knowledgeable about familiar with the chemical method used to eradicate grass weeds. In item (iii), they gave the correct reason why Paraquat was not recommended for eradicating specimens **P**, **U**, **T** and **I**. The reason was that *it is a contact herbicide and not a systemic herbicide. Once applied onto the weed it kills only the parts of the weed which become in contact with the chemical i.e. leaves and stems. For that reason; nuts, stolons, rhizomes of the weed remains safe. As a result the chemical fails to eradicate such weeds.* This suggests that the candidates had a good understanding of why contact herbicide could not be used to eradicate grass weed. In item (iv), the candidates correctly recommended the appropriate growth stage of specimens **P**, **U**, **T** and **I** for a maximum effectiveness of the proposed herbicide as *young actively growing stage*. This shows the candidates had a good understanding of point of intervention for a maximum effectiveness of herbicide.

Furthermore, in part (b) (i), the candidates gave correct observations of what happened in the experiments. The observations were *in experiment 1 specimen **X** reads by the arrow dilating to the right while in Experiment 2 spark occurred at the contact area of the two wires*. This implies the candidates had good observational skills and correctly followed the experimental procedures. In item (ii), they gave the correct aim of the

experiments which was *to check if the battery it is in working condition*. This indicates that the candidates understood the objective of the experiments. In item (iii), they gave correct points on how to care and maintain specimen **W**. These include *keep the level of electrolyte always correct, test the state of charge by using a hydrometer, use ammonia or soda solution to clean battery case then wipe it with warm water, check and replace the rubber pads where necessary, check corrosion from the terminals and inside connections of the battery terminals* and *ensure proper connections to the positive and negative terminals*. These candidates were knowledgeable of and skilled in caring and maintaining the tractor battery. In item (iv), they also gave the correct names and functions of specimen **W** and **X** which *were specimen W (Tractor battery) for lighting, especially when the tractor is stationary, providing power for ignition of the engine* and *storing the power produced by the generator to be used when the engine is idle. Specimen X (voltmeter) is an instrument used for measuring electrical potential difference between two points*. This shows the candidates managed to identify and give the functions of the different parts of the tractor engine. Extract 11.1 is a sample of the correct responses to the question.

| 2a) | i) It is difficult to manage specimen P in the crop field because it has got underground bulb or tubers which store food even in dry condition. | |
| | b) It is difficult to control specimen T in the crop field because it has got underground roots which help it to survive even in dry condition | |
| | c) It is difficult to control specimen I in the crop field because it has underground rhizomes which plant to survive even in dry condition. | |
| | ii) The herbicide suitable for eradicating specimen P, U, T and I is glyphosate because it is more effect in controlling underground roots and rhizomes of the weeds this is because when they are applied in leaves they are transmitted to the roots where the plant food is stored. | |

2 a) iii) The other choice of herbicide is not recommended because such a herbicide is not more effective in controlling underground bulbs, roots and rhizomes and this is the reason why they are not used in controlling specimen P, U, T and I

iv) The appropriate stage is when they are not matured, meaning that when they are still young, when the herbicide is applied and such weeds are still in a such stage it is very easy to control them and for this reason the herbicide became more effective

b) i) In experiment 1 the pointer of the specimen X moves meaning that the battery was having Voltage. In experiment 2 when there was a contact of two ends of material Z the sparks was seen, this means the battery is working.

ii) The aim of the two experiments is to determine the charge on specimen W and after the two experiments were done, it was proved that specimen W has got charge

**2b)** **iii)** Care and management of specimen W

ⓐ Test the level of electrolyte by using dip stick and if it is not correct put the electrolyte.

ⓑ Clean the metal case by using ammonia or soda solution.

ⓒ Connect the positive and negative terminals of specimen W properly.

ⓓ Apply grease or Vaseline to the two terminals of the battery to reduce it from corrosion.

ⓔ Change the rubber pads in which specimen W rest when it become old, this help to absorb shock.

**iv)** Specimen W is traitor battery
Specimen X is Voltameter

Uses of Specimen W
ⓘ Used for lightining when the traitor is stationary

Uses of specimen X
ⓘ Used to measure record the Voltage of the traitor battery

**Extract 11.1:** *A sample of the correct responses to Question 2*

Extract 11.1 exemplifies the correct responses to the question. The candidate possessed good practical skills and mastered the subject matter; hence, he/she provided the correct responses to almost all parts of the question. He/she missed one point in part (a) (i) for the difficulty in managing specimen **U**.

Referring to the statistics, 57.5 per cent of the candidates attained average performance on the question. Most of them responded correctly to many parts of the question except parts (a) (i) and (b) (iii). In part (a) (i), most of

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them failed to explain why was it difficult to manage specimens **P**, **U, T** and **I**. They provided responses like *compete with crop plants for water and nutrients, grow fast, adapted to the environment* and *have long life span* were provided by candidates. This shows the candidates were not knowledgeable about the difficulties of controlling grass weeds. In part (b) (iii), the candidates did not provide all the care and maintenance of the tractor battery that were demanded.

Nevertheless, 37.9 per cent of the candidates demonstrated weak performance. The majority of them provided incorrect responses to nearly the whole question. In part (a) (i), they failed to give reasons as to why it was difficult to manage specimens **P**, **U**, **T** and **I** in the crop field. They provided responses such as *they are perennial, poison to man, reduce production, by digging the farm, it destroys the crops, can grow in moist soil* and *by uprooting*. This shows that the candidates did not understand the difficulties encountered in managing grass weeds. In item (ii), they failed to identify or give reason for the herbicide which was suitable for eradicating specimens **P**, **U**, **T**, and **I**. The candidates did not understand the demand of the question. Hence, they named other chemicals *as booster, Urea, Barium sulphate, hydrogen peroxide and CAN* instead of one of the herbicides which were provided. In view of this, they gave incorrect reasons for their selection for example *it dry weed, weed become dormant, it does not scotch the plant* and *it control all weed in the field.* This implies that the candidates were not knowledgeable about the appropriate herbicide that could be used to eradicate grass weeds. Consequently, in item (iii), they failed to give reason as to why the other choice of herbicide was not recommended for eradicating specimens **P**, **U**, **T** and **I** in item (ii). Examples of these incorrect responses were *it increases the weed, it causes poisons in the soil, it has residue effect, it kills microorganism* and it *cause soil fertility*. This indicates that the candidates were not familiar with the mechanism of the action of contact herbicides. In item (iv), the candidates failed to recommend the most appropriate growth stage of specimens **P**, **U**, **T** and **I** for a maximum effectiveness of the proposed herbicide. The candidates provided several incorrect responses, such as *harvesting stage, affected stage, crop rotation stage, drying stage, fertilizer application,* and *during the night and at winnowing process.* This signifies that the candidates lacked knowledge of the appropriate stage of intervention for the effectiveness of the herbicide.

Likewise, in part (b) (i), the candidates failed to give correct observations in the experiments. They provided responses such as *reading of specimen Z and X, the charge of the battery, red particle occur, shining light* and *battery* and *spanner on the tables*. This suggests that the candidates lacked observational skills and did not properly follow the experimental procedures. In part (b) item (ii), the candidates failed to give the aim of the two experiments. They provided responses such as *to measure the weight of the battery, to check the wires, to determine the process of machinery, to see the battery of car* and *source of transport when it was in car*. These responses show that they did not understand the objective of the experiments. In addition in item (iii), they failed to explain how to care and maintain specimen **W**. Examples of the responses provided were *convection of direct current (dc) to alternate current (ac), use generator, put in the wood, wash by chemical, carry by using wheelbarrow, carry by using head, tight bolt and nuts of the battery, clean after use, place in the proper area* and *repair the broken*. This justifies that the candidates lacked knowledge of and skills in caring and maintaining a tractor battery. In item (iv), they also failed to name and give the function of specimens **W** and **X**. Some of the incorrect responses provided are *in specimen W -solar source of light, box- for supply hydro electrical power and engine-to covert petrol into light, in specimen X- wire for connecting battery, calculator- for measure speed car and electronic balance- for measure degree of temperature of the car*. These candidates did not understand the specimens provided and their functions. Extract 11.2 illustrates this scenario.

2 (a) (i) ~~Becaus~~ It is difficult to manage to Specimen P, U, I and J Because can reduce the quality of crop Production:

(ii) Herbicide which is used in Application of chemicals inorder to reduce the number of weeds On the field

(iii) Because the other herbicides can cause the weed to grow rapidly than the crop!

(iv)

| Specimen | Stages of growth. |
|---|---|
| ~~A~~ P | Perenial stage |
| ~~B~~ U | Annual stage |
| ~~C~~ I | Biannual stage |
| ~~D~~ 1 | Perronial stagoi |

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| | | |
|---|---|---|
| 2 | (b) (i) I observe that the battery has positive and negative charges with a clear value and other. | |
| | (ii) Aims Is to investigate the value of charges either positive or negative charge and show the battery system. | |
| | (iii) ⟶ Increase durability<br>⟶ Increase efficiency<br>⟶ Avoid demage to tools.<br>⟶ Avoid injury to uses.<br>⟶ Clean after use. | |
| | (iv)  Name<br>Specimen W - Spaner 12<br>Specime X - Spaner 13.<br><br>Functions:<br>⟶ Specimen W<br>It is used for tigthening and loosing the bolts and nuts.<br><br>⟶ Specimen X<br>It is used for opening and loosening the bolts and nuts of different sizes. | |

**Extract 11.2:** *A sample of the incorrect responses to Question 2*

Extract 11.2 the candidate provided responses that did not address the requirements of the question.

## 3.0 THE ANALYSIS OF THE CANDIDATES' PERFORMANCE ON EACH TOPIC AND FIELD

This section focuses on the analysis of the candidates' performance on each topic and field in the theory and practical papers, respectively. Analysis indicates that 10 topics were examined in matching items, short answer and essay questions in the theory paper. The candidates, attained good performance on six questions and average performance four questions. Furthermore, they attained good performance on one field and average performance on two fields in the practical paper.

The topics and field on which the candidates had good performance were Multiple Choice question (95%), Agricultural Development in Tanzania (93.80%), Agricultural Mechanisation (88.60%), Dairy Cattle Farming (86.60%), Methods of Improving Soil Fertility and Productivity (81.90%), Soil and its Agricultural Utilization (75.50%), Farm Records and Accounts (65.70%) and Cropping Systems and Planting Patterns (65.60%).

The candidates had average performance on the topics and fields of Crop Production and Agricultural Mechanics (62.10%), Soil and Water Conservation (61.10%), Soil Reactions (59.50%) and Principles of Livestock Production (43.10%).

Conversely, the candidates did not attain weak performance on any of the topics or field in this year's examination. Most of them scored above average in the questions that represent the different topics and fields. This indicates candidates' progressive achievement, compared to the analysis in 2020 where candidates had weak performance on 3 topics.

The performance of the candidates on the multiple choice questions, which that comprised different topics, remained to be good in two consecutive years, from 2020 to 2021. The performance has increased by 5.2 per cent in 2021 from last year.

## 4.0 CONCLUSION AND RECOMMENDATIONS

This section provides an overview of the analysis where the factors that contributed to the candidates' high and low scores on the examination have been pointed out. It also gives recommendations to improve candidates' performance in future examinations.

## 4.1 Conclusion

The candidates' performance in the Agriculture subject examination this year is good with the increased in percentage of the candidates who passed compared to 2020. This is also accompanied by the increase in the percentages of the candidates who got higher pass grades (A, B and C). The analysis showed that the candidates who scored high grades possessed adequate knowledge of the subject matter. They also had good mastering of the English language. This enabled them to provide correct responses based on the demand of the question.

Despite the good performance in Agricultural science subject, the analysis revealed some of the candidates had poor performance because of inadequate knowledge of the subject matter knowledge and poor English language proficiency. In general, the following factors caused the candidates to score low marks in some questions:

(a) Inadequate knowledge of the subject matter which made them to provide incorrect responses to the questions.

(b) Misconceptions of the questions which made them to respond contrary to the demands of the questions.

(c) Inadequate practical skills which hindered them from providing correct responses to the questions which demanded the use of practical skills.

(d) Poor proficiency in the English language which made them to give less detail responses or wrote sentences which were grammatically incorrect.

(e) Poor essay writing skills which made them fail to organise their ideas in introduction, conclusion and main bodies.

(f)   Failure to understand some of the action verbs used. For example, some questions required the candidates to *describe* but they gave an outline.

## 4.2   Recommendations

Based on the candidates' performance shown in this report, the following are recommended:

(a)   Students should participate more in practical because they learn better by seeing and doing. Hence, the Agricultural Laboratory and Farm Workshop should be equipped with all necessary apparati, equipment, specimens, chemicals, materials and tools to facilitate learning by doing.

(b)   Presence of school farms and gardens outside laboratories where students translate the theory taught in the classroom into practice.

(c)   Teachers have to adopt team teaching by consideration areas of specialization and competences to impart students with appropriate knowledge and skills.

(d)   Students have to be motivated to learn using a variety of learner-centered teaching methods. These include field trips, discussion, demonstration, brainstorming, and practical work.

(e)   Remedial classes should be offered to slow learners who have to be identified earlier. This will help them to catch up with their peers in terms of acquisition of knowledge and skills.

(f)   Assessments of students have to involve giving effective feedback on assessment so that the learner knows where he/she needs to improve.

(g)   Students should make deliberate efforts to improve their English language proficiency by participating in debates; reading books, newspapers and magazines; getting around with people who speak English and practise speaking English.

(h)   Students have to be instructed on how to respond to essay questions and how to respond following the action verbs used in the examination questions used.

**Candidates' Performance per Topic and Field in 034-Agricultural Science CSEE 2021**

| S/N | Topic/Field | Question Number | Percentage of the Candidates who scored the average of 30 per cent or Above | Comments |
|-----|-------------|-----------------|------------------------------------------------------------------------------|----------|
| 1. | Environmental Degradation, Farm Power Machinery, Methods of Improving Soil Fertility and Productivity, Crop Protection, Factors Affecting Livestock Production in Tanzania, Agricultural as a Science, Agricultural Marketing and Annual Field Crops Production | 1 | 95.00 | Good |
| 2. | Agricultural Development in Tanzania | 9 | 93.80 | Good |
| 3. | Agricultural Mechanisation | 3 | 88.60 | Good |
| 4. | Dairy Cattle Farming | 5 | 86.60 | Good |
| 5. | Methods of Improving Soil Fertility and Productivity | 8 | 81.90 | Good |
| 6. | Soil and its Agricultural Utilization | 1 | 75.50 | Good |
| 7. | Farm Records and Accounts | 4 | 65.70 | Good |
| 8. | Cropping Systems and Planting Patterns | 6 | 65.60 | Good |
| 9. | Crop Production and Agricultural Mechanics | 2 | 62.10 | Average |
| 10. | Soil and Water Conservation | 7 | 61.10 | Average |
| 11. | Soil Reactions | 10 | 59.50 | Average |
| 12. | Principles of Livestock Production | 11 | 43.10 | Average |
| 13. | Factors Affecting Crop Production in Tanzania | 2 | 39.10 | Average |