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) 2023

AGRICULTURE

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034 AGRICULTURE

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FOREWORD

This report presents Candidates' Item Response Analysis (CIRA) on the performance of the candidates who sat for the Certificate of Secondary Education Examination (CSEE) 2023 in the Agriculture subject. The report aims to provide feedback to all education stakeholders on the factors that contributed to the candidates' performance in Agriculture subject.

The CSEE is a summative evaluation, which measures learners' achievement after completing four years of study in secondary education. Basically, it is designed to assess the learning of the candidates in terms of knowledge gained, and skills developed. It also evaluates the extent to which the candidates can apply the knowledge and skills gained to solve the social, political, economic and technological challenges to enhance individual and national development. Importantly, the examination is used for screening purposes to identify candidates with outstanding academic merits to continue learning at the advanced secondary school level and other learning institutions.

Performance statistics show that, the majority of the candidates scored low marks hence attained low grades. The report pinpoints the reasons behind such performance including inadequate knowledge, misunderstanding, and poor understanding of the concepts and lack of practical skills. On the other hand, candidates who scored high grades exhibited good understanding of the concept and practical skills.

The National Examinations Council of Tanzania (NECTA) expects that the feedback provided in this report will shed light on the critical issues for which stakeholders can design and take proper measures focusing on improving teaching and learning of the Agriculture subject.

The Council expresses gratitude to subject coordinators, examiners, and all who participated in the preparation of this report.

Dr. Said Ally Mohamed
EXECUTIVE SECRETARY

1.0 INTRODUCTION

This report presents the analysis of the candidates' performance in the Certificate of Secondary Education Examination (CSEE) 2023 in Agriculture subject. The examination was set as per 2022 examination format based on Agriculture Syllabus published in 2019.

The examination consisted of two papers; 034/1 Agriculture 1 (Theory paper) and 034/2 Agriculture 2 (Practical paper). The theory paper had three sections A, B and C with a total of eleven questions. The candidates were required to answer all questions in sections A and B and two questions from section C. Section A had two objective questions. Question one consisted of ten multiple choice items each carrying 1 mark, making a total of 10 marks and question two comprised six matching items each carrying 1 mark, making a total of 6 marks. The section carried a total of 16 marks. Section B consisted of six short answer questions each carrying 9 marks, making a total of 54 marks. Section C had three essay questions each carrying 15 marks. In total, the paper weighed 100 marks.

The practical paper consisted of two short answer questions each carrying 25 marks. The candidates were required to answer all the questions. The paper weighed 50 marks.

A total of 6,976 candidates were registered to sit for the CSEE this year, out of which 6,835 (97.97%) sat for the examination. The performance statistics indicate that, 6,035 (88.49%) candidates passed and 785 (11.51%) failed the examination. Performance of the candidates in this year has decreased by 5.60 per cent compared to 2022. However, the general performance in the examination was good.

The performance of the candidates was categorized into five grades (A, B, C, D and F). Each grade had a respective score interval and remarks as follows: A (75-100) Excellent, B (65-74) Very good, C (45-64) good, D (30-44) Satisfactory and F (0-29) Fail. Table 1 portrays the performance of the candidates in agriculture subjects in CSEE 2023 grade-wise and gender wise.

Table 1: Performance of the candidates in Agriculture subject in different grades gender-wise in CSEE 2023

Grades	A	B	C	D	F	Withheld	Total
Female	17	102	1238	1,403	519	8	3,287
Male	76	189	1,751	1,259	266	7	3,548
Total	**93**	**291**	**2,989**	**2,662**	**785**	**15**	**6,835**

Source: NECTA Statistics Book, **pg 8**, CSEE (2023)

Referring to Table 1, 50.43 per cent of the candidates attained low grades (D and F) and 49.57 per cent high grades (A, B and C).

The following sections present the analysis of candidates' performance in each question, topic and field. Conclusion and recommendations have also been included.

2.0 THE ANALYSIS OF THE CANDIDATES' PERFORMANCE ON EACH QUESTION

This section presents the analysis of the candidates' performance on each question. The description provided focuses on the demand of the question, the performance of the candidates on the question, and reasons for the level of performance achieved. Extracts showing samples of correct and incorrect responses for specific questions from candidates' scripts and graphics for illustrations have also been included.

In the analysis, the performance is considered weak, average or good if the percentage of the candidates' scores ranges from 0-29, 30-64, and 65-100 respectively. Three colours; green, yellow, and red are used to indicate good, average, and weak performance respectively.

2.1 034/1 AGRICULTURE 1

2.1.1 Question 1: Multiple Choice Items

The question consisted of ten items derived from the following topics: *Mechanisation in Agriculture, Agricultural Development in Tanzania, Agricultural Marketing, Basics of Farm Management, Principles of Crop Production, Introduction to Livestock Production, Agro-forestry, Animal Husbandry* and *Crop Husbandry*. The candidates were required to choose the correct response from

the given alternatives and write its letter beside the item number in the answer booklet provided.

The question was attempted by 6,835 (100%) candidates, of which 278 (4.07%) scored from 0.0 to 2.0 marks, 3,506 (51.29%) from 3.0 to 6.0 marks and 3,051(44.64%) from 7.0 to 10 marks. Figure 1 shows the distribution of the candidates' scores on the question.

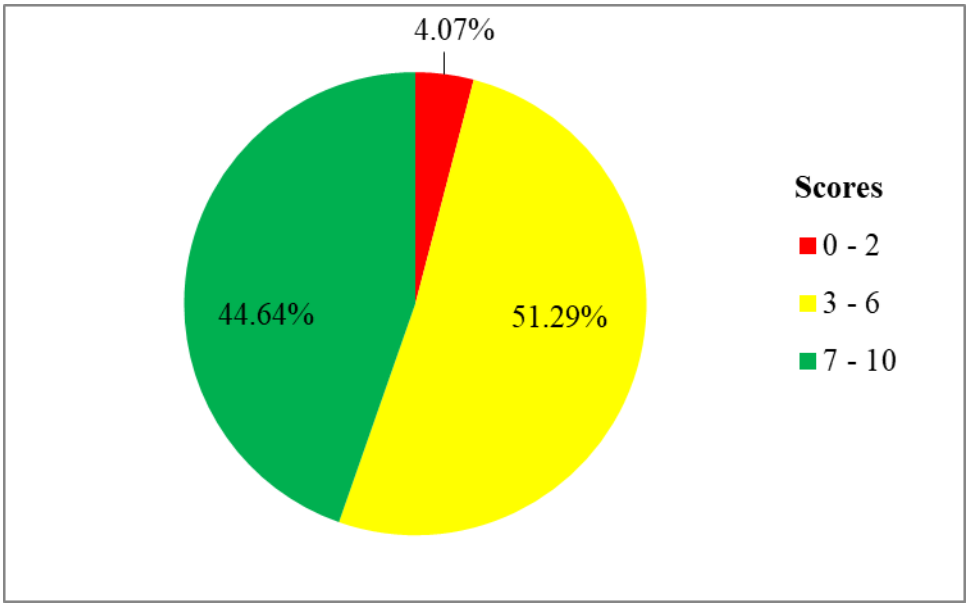


Figure 1: C*andidates' Performance on Question 1*

As per Figure 1, 95.93 per cent of the candidates scored from 3.0 to 10 marks and 4.07 per cent from 0.0 to 2.0 marks. The general performance on the question was good. The analysis of the responses indicates that majority of the candidates provided correct responses in items (i), (ii), (iii), (iv), (v), (vi), (vii) and (viii) and incorrect responses in items (ix) and (x) as follows:

In item (i), the candidates were required to choose an option that describes the act of possession of right to the ownership and use of land. The item tested the candidates' understanding of the concept of land tenure. The correct response was A (Land tenure). The distractors were; B (Landlordism), C (Land reforms) D (Land fragmentation) and E (Land consolidation).

Majority of the candidates provided correct response signifying good understanding of the concept of land tenure. Land tenure contains rules and arrangements connected with owning land, especially land that is used for farming. The distractor B (Landlordism); is the system whereby land is owned by landlords to whom tenants pay fixed rent, C (Land reforms); is the government's policy designed purposely to reorganize and transform the land ownership by restructuring the pattern of land use, distribution, ownership and management. The distractor D (Land fragmentation) is where a farmer has many smallholdings of land parcel often scattered over a wide area and E (Land consolidation) is the bringing together the piece of land from fragmented uneconomic holdings for better and efficient utilization.

In item (ii), the candidates were required to opt for a term, which represents a market in which the conditions of perfect competition are lacking. The item tested the candidates understanding of classification of agricultural markets. The correct option was E (imperfect market). The distractors were A (spot market), B (general market) C (specialized market) and D (perfect market). Majority of the candidates provided correct option indicating to be knowledgeable of classes of agricultural markets. Imperfect market is the situation whereby there are many sellers selling different goods and can influence the price of the commodities. The distractor A (spot market) refers to an agricultural market in which goods are exchanged with money immediately after sale, B (general market) is the market in which all types of commodities are bought and sold. In addition, C (specialized market) is a market in which transactions take place only with one or two farm produce and D (perfect market) is the market with large number of buyers and sellers with perfect knowledge of demand and supply.

Item (iii) required the candidates to select an alternative indicating a system of keeping domesticated birds that creates a habit of cannibalism. The item assessed the candidates' knowledge on the systems of keeping poultry. The correct response was B (deep litter system). The distractors were A (free range), C (battery cage), D (house and run) and E (fold unit). Majority of the candidates provided correct option implying possession of adequate knowledge of the systems of keeping poultry. Deep litter system involves keeping birds in a house or pen where litter is spread on the floor thus facilitating cannibalism. The distractor A (free range) is the system of keeping poultry whereby the birds are allowed to go out and search for food

and water and come back home in the evening. Distractor C (battery cage) is the type of poultry rearing system whereby birds are kept in cages. Likewise, distractor D (house and run) is the system where birds are provided with a small house surrounded by the enclosure called a run and E (Fold unit) consists of small houses and run where the house is mobile. In all the distractors, the birds are free enough to have space to escape cannibalism contrary to the deep litter where the birds are confined in one area and are in contact to one another.

In item (iv), the candidates were require to choose an option which is NOT a method of controlling unexpected challenges in farming. The item examined the candidates' knowledge of the methods of controlling risks and uncertainty in agricultural production. The correct response was E (specialization). The distractors were A (diversification), B (insurance), C production on contract basis and D maintaining liquidity. Majority of the candidates provided correct option indicating possession of adequate knowledge of the methods of controlling risk and uncertainty. Specialization is the situation whereby a farmer deals with one enterprise at a time hence increasing possibility of risks and uncertainty in farming business. On the other hand, all the distractors were correct measures for controlling risk and uncertainties in farming business.

Item (v) required the candidates to select an alternative representing the term that is a practice of supporting tall varieties of tomatoes before they bear fruits. The item tested candidates' knowledge and skills of management practices in tomato production. The correct response was C (staking). The distractors were A (propping), B (pruning), D (defoliation) and E (topping). Majority of the candidates provided correct response signifying to be knowledgeable and skilled of management practices in tomato production. Staking is the practice of tying the tomato plant to an upward rod-like structure for support and encouraging growth. The distractor A (propping) is the practice of placing support beneath the plant or its branches to prevent them from falling or bending. Distractor B (pruning) is the removal of extra or unwanted parts of a plant while distractor D (defoliation) refers to the act of removing foliage from the plant. Distractor E (topping) refers to the practice of removing terminal buds after the plant attains a certain recommended height. Therefore, not all the distractors met demand of the question.

Item (vi) required the candidates to choose an option that presents a set of animals that produce hair for clothing. The item tested the candidates' understanding of the livestock products. The correct option was D (sheep and goats). The distractors were A (pigs and cattle), B (cattle and sheep), C (cattle and goats) and E (pigs and goats). Majority of the candidates chose the correct option indicating good understanding of the livestock products. Apart from sheep and goat the rest of the livestock in the distractors do not produce hair as part of their products.

In item (vii), the candidates were required to choose an option having the tools, which are commonly used by most peasants in small-scale agriculture. The item tested the candidates' knowledge of the common farm tools. The correct response was B (hand hoe and machete). The distractors were A (wheelbarrow and hand hoe), C) (knapsack sprayer and machete), D (wheelbarrow and hand duster) and (E) (wheel barrow and machete). Majority of the candidates chose the correct option showing good understanding of common farm tools used by peasant societies. Peasants use machete to clear bushes and hand hoe for digging the soil. All the tools presented in the distractors are used in farm activities but the most commonly used by peasant farmers are hand hoe and machete.

Item (viii) required the candidates to choose an option for the factors that determine the quality of farmyard manure. The item tested the candidates' understanding of the concept of farmyard manure. The correct response was D (type of feed eaten and type of beddings used). The distractors were; A (animal type, type of feed eaten and weight of an animal), B (type of feed eaten, age of the animal and types of beddings used), C (age of an animal and weight of an animal), and E (animal type, type of feed eaten and weight of an animal). Majority of the candidates chose the correct alternative. This indicates they were familiar with the factors that determine the quality of farmyard manure. The more nutritive the feed eaten, the more nutrients are available in the manure. Likewise, the beddings used that contains straws or plant materials yield quality manure than beddings containing wood shavings. Age of the animal, weight of the animal and the type of the animal do not influence the quality of farmyard manure.

Item (ix) required the candidates to choose an alternative that is a diagnosis made after observing mass of soot on some parts of maize plants. The item

tested the candidates' knowledge and skills of crop plants diseases. The correct option was E (sign of smuts). The distractors were A (sign of blight), B (sign of dumping off), C (sign of mildews) and D (sign of mosaics). Majority of the candidates provided incorrect responses indicating lack of knowledge of the concepts of plant disease and skills in diagnosing smut disease in maize plants. The distractor A (sign of blight) is characterised by chlorosis and death of plant tissue, B (sign of dumping off) is characterised by appearance of water soaked stem. Moreover, C (sign of mildews) can be diagnosed by a thin whitish coating and D (sign of mosaics) is characterized by yellowing of the leaves.

Item (x) required the candidates to choose an option which is the use of bee vail as a protective gear in beekeeping. The item tested the candidates understanding of the use of protective gears in beekeeping. The correct response was C (covering the face up to the neck). The distractors were A (keeping the head cool on hot days), B (covering the ankles) D (protecting the body againist bee sting) and E (calming down bees). Majority of the candidates chose incorrect responses signifying the lack of knowledge and skills of the use of protective gears in beekeeping. Most candidates were attracted to option D (protecting the body against bee sting). They failed to realise that the other parts of the body is already protected by the overall coat, gumboots and hand gloves.

2.1.2 Question 2: Matching Items

This question consisted of six items from the topic of *Crop Husbandry*. 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 phrases that describe the symptoms of crop plants diseases whereas List B comprised of the corresponding diseases. The question measured the candidates' knowledge and skills of crop plant diseases.

List A	List B
(i) Appearance of masses of orange brown spores on leaves and on the green tender parts of the plants. (ii) Appearance of white or grey substance on the leaves and stems. (iii) Appearance of water soaked parts in the plant. (iv) Appearance of soot, which occurs on some parts of a plant. (v) Appearance of irregular patches which are light green or dark green in colour that develops on leaves. (vi) Appearance of small isolated areas on leaves which become necrotic.	A. Leaf spot B. Wilts C. Anthracnose D. Rusts E. Mosaic F. Downy mildew G. Smuts H. Dumping off

The question was attempted by 6,835 (100%) candidates, whereby 2,943 (43.06%) scored from 0.0 to 1.0 mark, 2,956 (43.25%) from 2.0 to 2.0 marks and 936 (13.69%) from 4.0 to 6.0 marks. Figure 2 shows the distribution of the candidates' scores on the question.

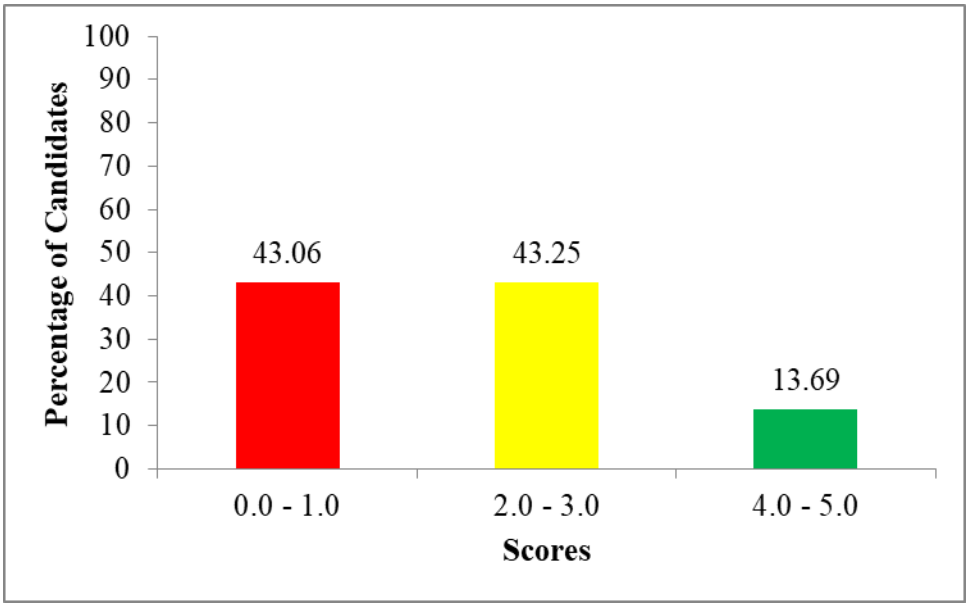


Figure 2: C*andidates' Performance on Question 2*

With respect to Figure 2, 56.94 per cent of the candidates scored from 2.0 to 6.0 marks whereas 43.06 percent from 0.0 to 1.0 mark. The candidates' performance on the question was average. Analysis of candidates' responses showed that items (i), (ii) and (iii) were attempted correctly by most of the candidates, whereas items (iv), (v) and (vi) were incorrectly attempted. Analysis of the candidates' responses in each item is provided here under:

Item (i) required the candidates to choose an option for the disease characterised by the appearance of masses of orange-brown spores on leaves and the green tender parts of the plant. The correct response was D (Rusts). Most of the candidates chose the correct response indicating good understanding of the disease.

For item (ii), the candidates were required to choose an option, which is the diseases diagnosed by the appearance of white or grey substance on the leaves and stems. The correct response was F (Downy mildew). Most of the candidates chose the correct response indicating good understanding of the disease.

Item (iii) required the candidates to choose an option for the disease characterised by appearance of water-soaked parts in the plant. The correct

response was H (Dumping off). The majority of the candidates provided correct response implying possession of adequate knowledge and skills of the disease.

In item (iv), the candidates were required to choose an option for the disease characterised by the appearance of soot which occurs on some part of plant. The correct response was G (Smuts). Majority of the candidates chose a variety of incorrect responses indicating lack of knowledge and skills of the diseases.

Item (v) required the candidates to choose an option representing the disease characterised by the appearance of irregular patches which are light green or dark green in colour that develops on leaves. The correct response was E (Mosaics). The majority of the candidates chose incorrect responses signifying insufficient knowledge and skills of the diseases.

Item (vi) required the candidates to choose an option which is the disease characterised by the appearance of small isolated areas on leaves which become necrotic. The correct response was A (Leaf spot). The majority of the candidates provided incorrect responses. This indicates lack of knowledge and skills of the disease.

2.1.3 Question 3: Principles of Crop Production

The question comprised parts (a) and (b). The candidates were required to: (a) give three disadvantages of the late planting and (b) briefly describe six factors that farmers were supposed to observe during the selection of seeds. The question tested the candidates' understanding of the concept of seed selection and planting.

The question was attempted by all 6,835 (100%) candidates, whereby 1,351 (19.77%) scored from 0.0 to 2.5 marks, 3,527 (51.60%) from 3.0 to 5.5 marks and 1,957 (28.63%) from 6.0 to 9.0 marks. Figure 3 illustrates the distribution of candidates' scores on the question.

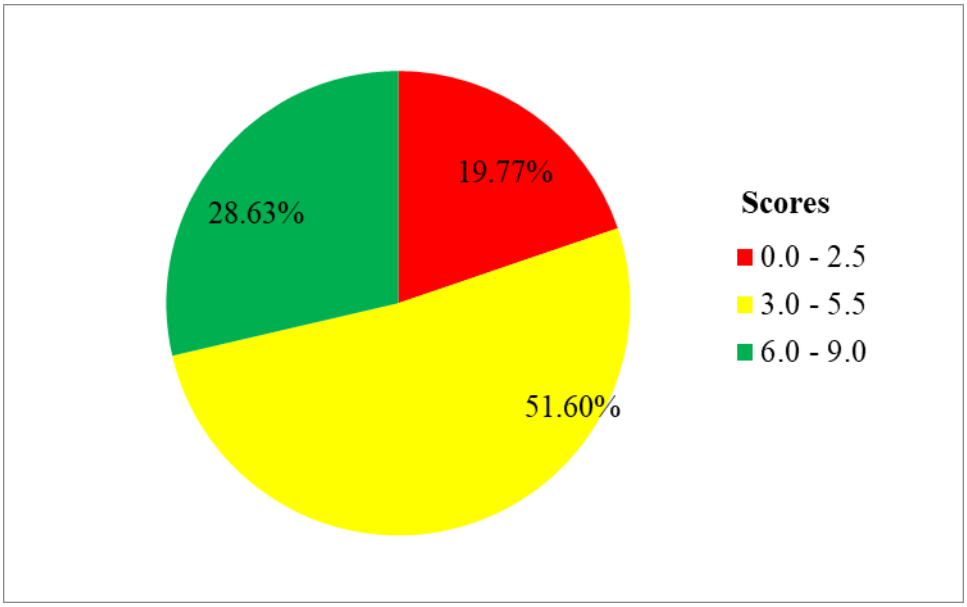


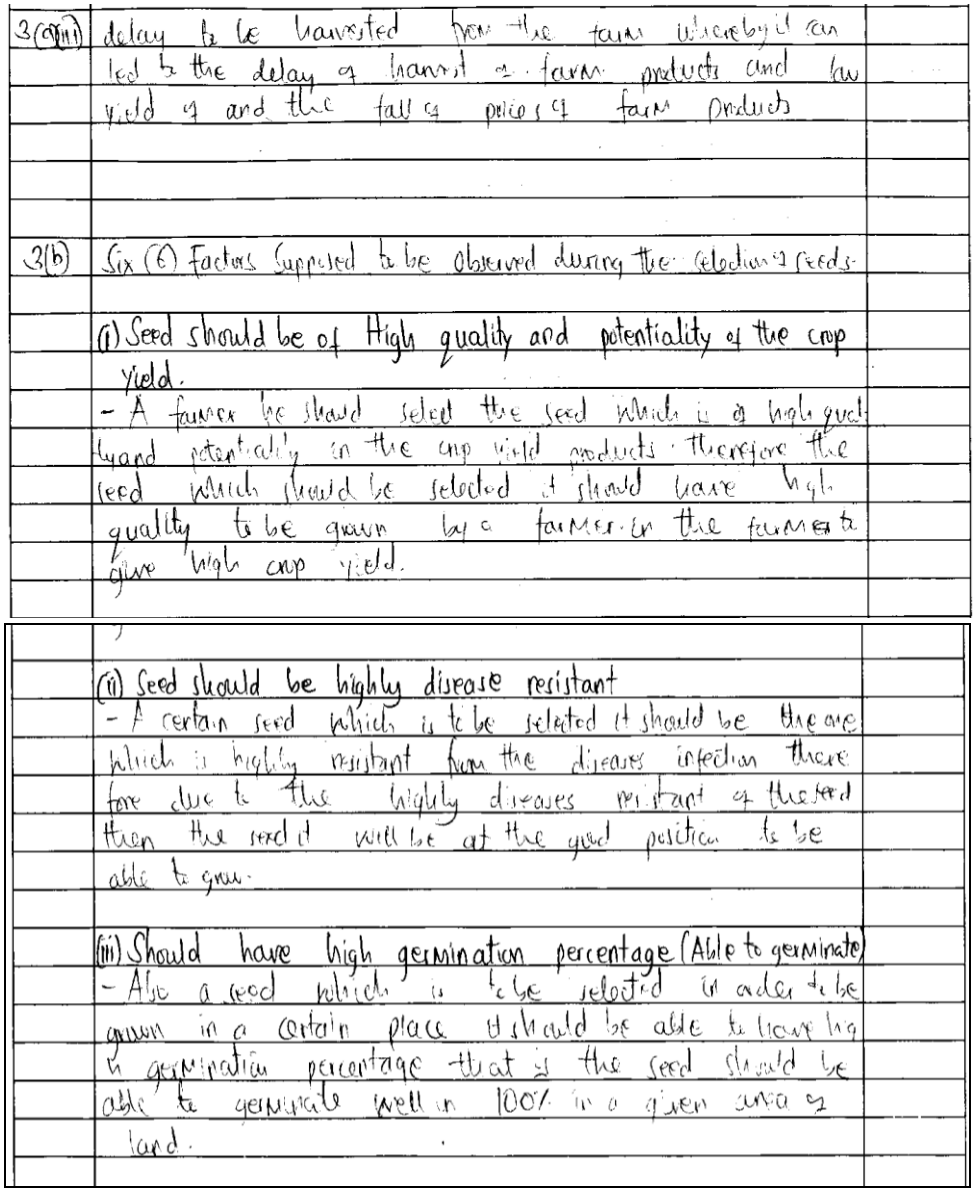
Figure 3: C*andidates' Performance on Question 3*

According to Figure 3, 80.23 per cent of the candidates scored from 3.0 to 9.0 marks while 19.77 per cent from 0.0 to 2.5 marks. The statistics show that, the performance was generally good. Data analysis depicts 28.63 per cent of the candidates did well on the question. The majority of them attempted correctly almost all parts of the question.

In part (a), the candidates managed to give correct responses on the disadvantages of late planting such as; *the crop will not get the maximum benefit from available moisture, the crop will not make good use of nitrogen flush (a sharp rise in nitrogen quantity in the soil at the beginning of rains), plants will not mature early and hence the farmer cannot benefit from the better price.* In addition, *it will not enable crops to escape from the late attack from some pests and diseases which emerge late in the season, the crops will not be vigour to resist some diseases*. This shows the candidates were knowledgeable of the disadvantages of late planting.

Likewise, in part (b) they correctly described factors that farmers were supposed to observe during the selection of seeds. Examples of such correct responses were *the selection of quality seeds should ensure that the seeds selected are suited to the environment in terms of rainfall pattern, seeds should be selected from healthy, vigorously growing plant to ensure fast*

establishment, the seeds selected should be whole and free from cracks or any physical damage which may affect germination, only seeds which are matured should be selected, the seeds should be free from pests and diseases, seeds should have the required shape which is important factor for seeds to be drilled using planters, seeds should be pure and free from contamination by foreign materials such as weed seeds. The responses provided imply the candidates had a good understanding of the factors to consider in selection of seeds. Extract 1.1 shows an example of the candidates' correct responses on the question.



3(a)(ii) delay to be harvested from the farm whereby it can lead to the delay of harvest of farm products and low yield of and the fall of prices of farm products

3(b) Six (6) Factors Supposed to be Observed during the selection of seeds.

(i) Seed should be of High quality and potentiality of the crop yield.
- A farmer he should select the seed which is of high quality and potentiality in the crop yield products. Therefore the seed which should be selected it should have high quality to be grown by a farmer. In the farmers to give high crop yield.

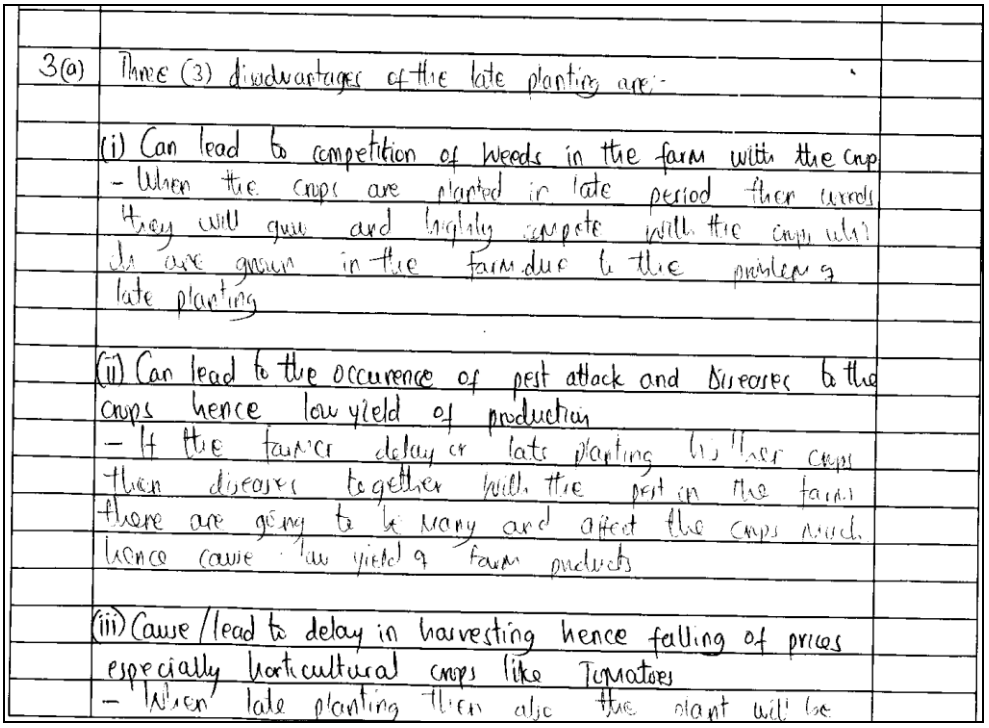
(ii) Seed should be highly disease resistant
- A certain seed which is to be selected it should be the one which is highly resistant from the diseases infection therefore due to the highly diseases resistant of the seed then the seed it will be at the good position to be able to grow.

(iii) Should have high germination percentage (Able to germinate)
- Also a seed which is to be selected in order to be grown in a certain place it should be able to have high germination percentage that is the seed should be able to germinate well in 100% in a given area of land.

3(b) (iv) Seed should be purity one or pure seeds
- Seeds which are required to be grown in the certain area or piece of land it should be pure one that not contaminated with the other Variety hence before planting farmer should select the seeds which are pure one and of the same Variety to be grown in the piece of land.

(v) Seed should be Tolerance from climatic changes like Temperature, Rainfall.
- Seed which is supposed to be selected by a farmer so as to be grown in the certain area or piece of land it should be tolerance from the climatic changes thus it should be able to survive under different even bad condition for a long time

(vi) Seeds should be Mature (Maturity) and fertile one
- Also the seeds which are required to be grown or planted it should be well matured enough or it should be reached in the maturity stage that to be early and will grown in the certain area or a certain piece of land.


3(a) Three (3) disadvantages of the late planting are:-

(i) Can lead to competition of weeds in the farm with the crop
- When the crops are planted in late period then weeds they will grow and highly compete with the crops which are grown in the farm due to the problem of late planting

(ii) Can lead to the occurence of pest attack and diseases to the crops hence low yield of production
- If the farmer delay or late planting his/her crops then diseases together with the pest in the farm there are going to be many and affect the crops much hence cause low yield of farm products

(iii) Cause/lead to delay in harvesting hence falling of prices especially horticultural crops like Tomatoes
- When late planting then also the plant will be

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

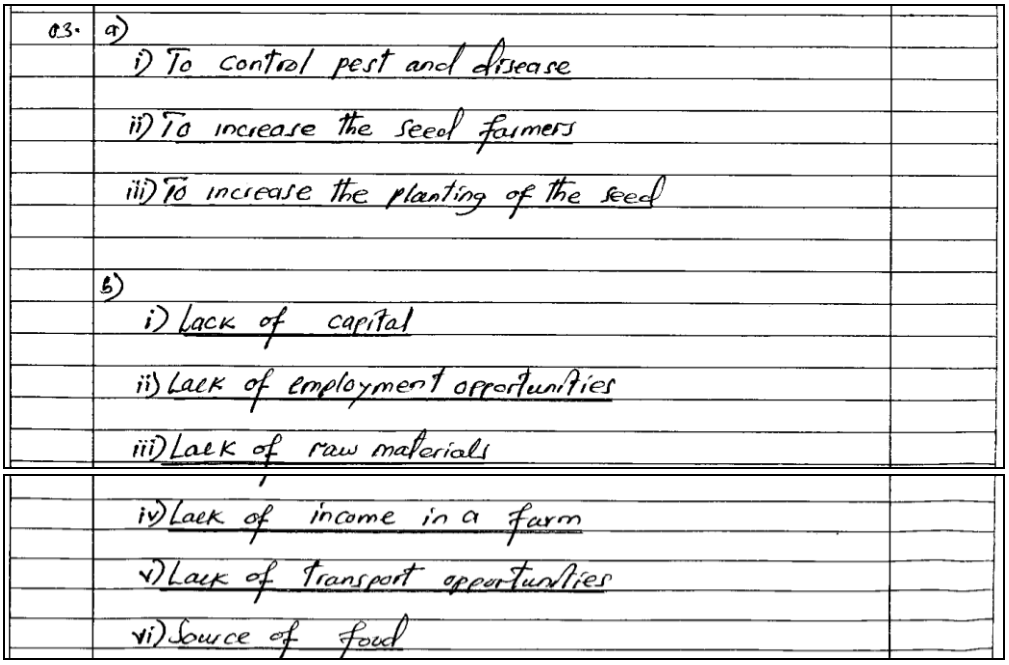
Extract 1.1 shows responses from a candidate who demonstrated good understanding of the disadvantages of late planting and successfully described the factors that farmers were supposed to observe during the selection of seeds.

Further analysis indicates that 51.60 per cent of the candidates had average performance. Majority of them managed to provide correct responses in part (a) while in part (b) they provided some points without explanations. Others failed to exhaust all points in both parts of the question as a result scored low marks. Their responses indicate possession of insufficient knowledge of the subject matter.

On the other hand, 19.77 per cent of the candidates had weak performance. Most of them provided incorrect responses in both parts of the question. In part (a), they failed to give the disadvantages of late planting. The incorrect responses provided were; *it consumes a lot of time to plant, it do not have labour force, it reduces the cost of production, poor storage facilities, it cause damping off to plant, it causes soil erosion, increases soil fertility, it increases soil productivity to the farmer and it cause environmental degradation*. The responses provided were not only the disadvantages but some were the

advantages implying that the candidates did not understand the demand of the question.

Similarly, in part (b) they were unable to describe factors to be observed during selection of seeds. They provided a variety of incorrect responses. For example, *the seed used should be of high quality, the type of seed to be planted, consider the market, consider the capital used to obtain the seeds, apply high amount of water to the seedbed, consider the number of seeds per hole, consider fertility of the soil and control weed*. The candidates showed poor understanding of the subject matter. Extract 1.2 is an example of incorrect responses on the question.



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

Extract 1.2 exemplifies responses from a candidate who demonstrated lack of understanding of the disadvantages of late planting and factors that farmers were supposed to observe during the selection of seeds.

2.1.4 Question 4: Principles of Livestock Production

The question required the candidates to suggest six features to be considered when constructing a livestock house in a given area of land. The question

tested the candidates' knowledge and skills on livestock management specifically on housing aspect.

All 6,835 (100%) candidates attempted this question, out of which 4,911 (71.85%) scored from 0.0 to 2.5 marks, 1,467 (21.46%) from 3.0 to 5.5 marks and 457 (6.69%) from 6.0 to 9.0 marks. Figure 4 summarises the distribution of candidates' scores on the question.

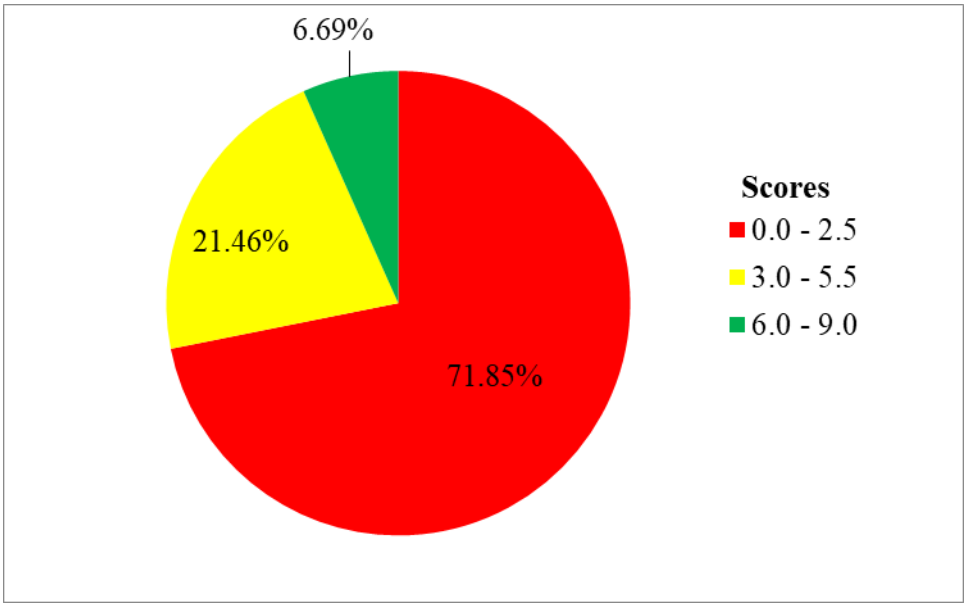
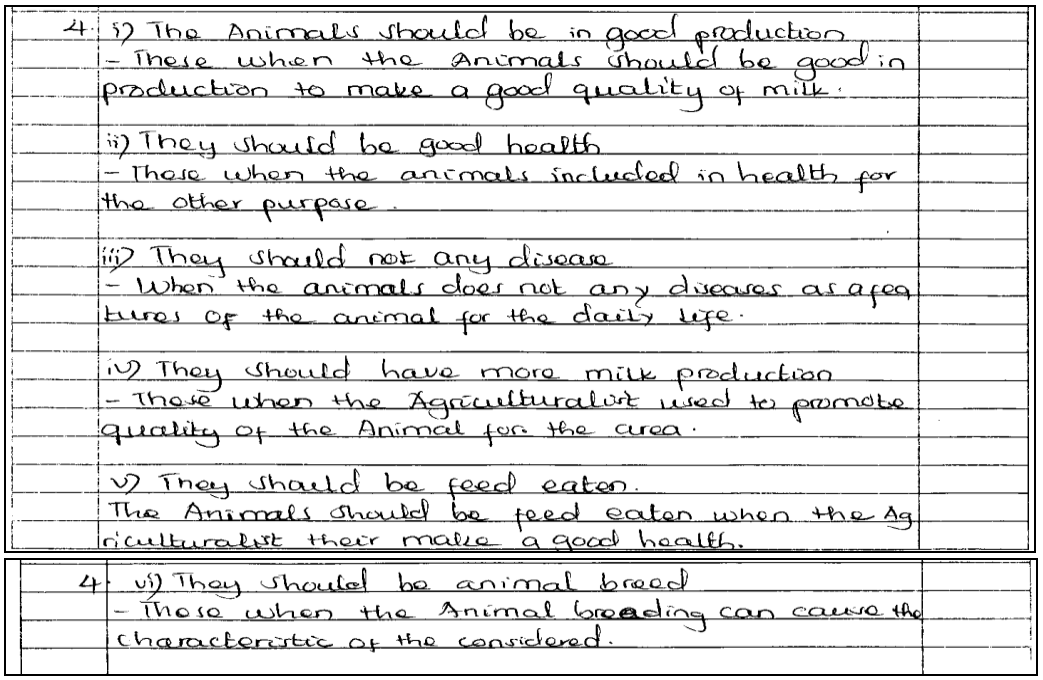


Figure 4: C*andidates' Performance on Question 4*

Referring to Figure 4, 71.85 per cent of the candidates scored from 0.0 to 2.5 marks while 28.15 per cent of the candidates from 3.0 to 9.0 marks. Generally, candidates' performance on the question was weak.

Data indicate that 71.85 per cent of the candidates did poorly on the question. The majority failed to suggest features to be considered when constructing livestock houses. They provided features for a good livestock house such as; *the livestock house should have feeding area with feeding materials, it should have the milking place (milking parlour), livestock housing should have water supply facility, it should have a sewage system, should have calving area, it should have cubicles, it should have a walking area and it should have the resting area*. Their responses indicate that the candidates had misconceptions. Others provided a variety of incorrect responses such as; *capital availability, space availability, type of livestock to be kept in such houses, types of system used in keeping*

livestock, livestock houses should be near pasture area, it should have good roof and well ventilated. The candidates' responses signify lack of understanding of the features to be considered when constructing livestock houses in a given area of land. Extract 2.1 shows a sample of incorrect responses to the question.



4. i) The Animals should be in good production
- These when the Animals should be good in production to make a good quality of milk.

ii) They should be good health
- These when the animals included in health for the other purpose.

iii) They should not any disease
- When the animals does not any diseases as a features of the animal for the daily life.

iv) They should have more milk production
- These when the Agriculturalist used to promote quality of the Animal for the area.

v) They should be feed eaten.
The Animals should be feed eaten when the Agriculturalist their make a good health.

4. vi) They should be animal breed
- These when the Animal breading can cause the characteristic of the considered.

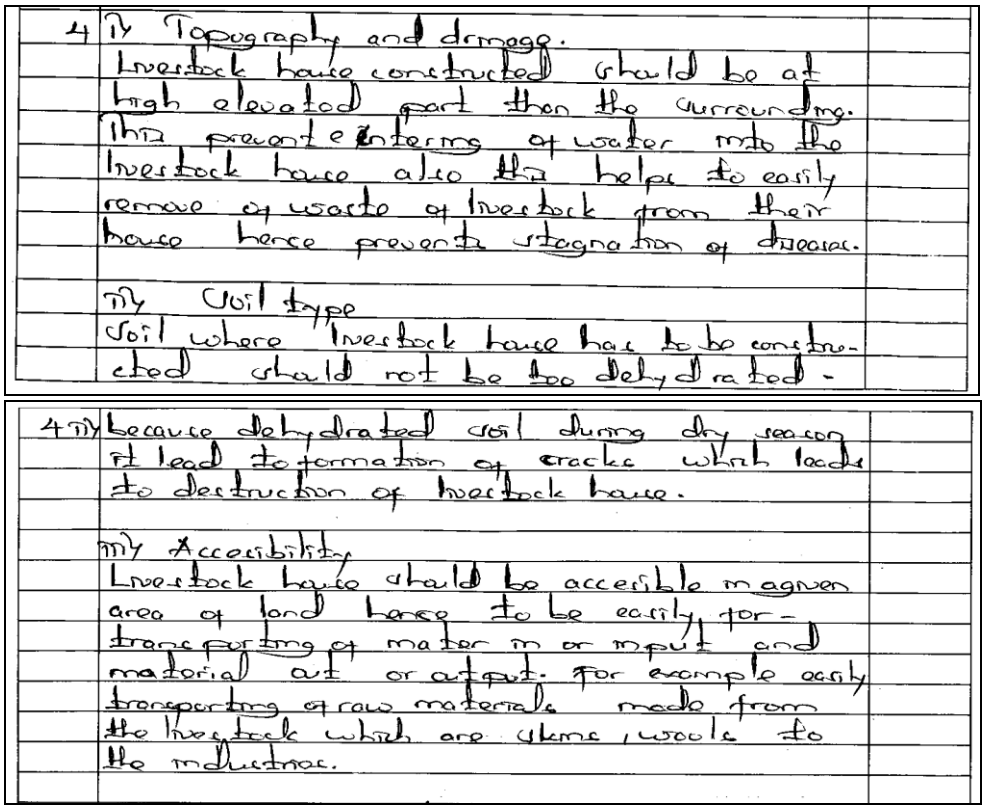
Extract 2.1: *A sample of the candidates' incorrect responses to Question 4.*

Extract 2.1 indicates responses from a candidate who exhibited lack of understanding of the features to be considered when constructing a livestock house. The candidate provided the qualities of the animal instead of the features of a livestock house.

Furthermore, 21.46 per cent of the candidates had average performance. Most of them were able to give the features to be considered when constructing a livestock house without sufficient explanations. On the other hand, other candidates were unable to exhaust all points. The average performance of the candidates is attributed to partial knowledge and skills of subject the matter.

However, 6.69 per cent of the candidates had a good performance. They managed to suggest the features to be considered when constructing livestock

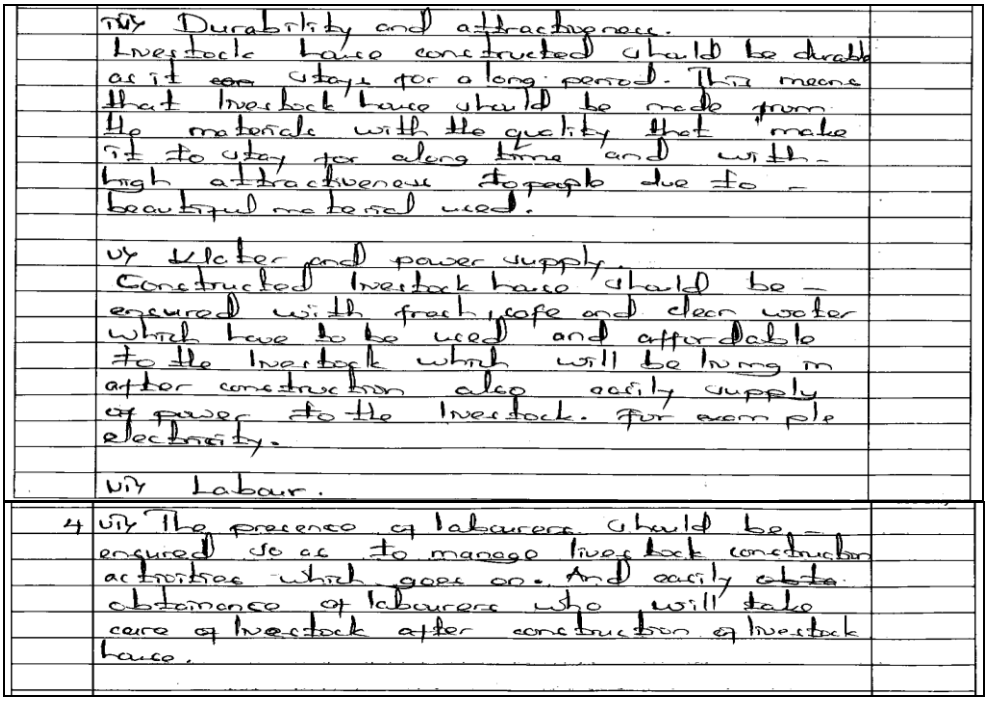
houses. Examples of correct responses include; *a livestock building should be at a higher elevation than the surrounding ground to offer a slope for drainage of the waste from animals and rain water, foundation soil should not be too dehydrated or desiccated, livestock houses should be situated in such a way that it is easily accessible, it should be durable, abundant supply of fresh, clean and safe water should be available at affordable cost, the area should be located where economic and regular supply of labour for housing management has to be available* and *livestock yards should be constructed and situated in relation to feed storages, manure disposal pits and other important structures or facilities in the farm.* The candidates' correct responses signify possession of adequate knowledge and skills of the subject matter. Extract 2.2 presents a sample of the correct responses to the question.


4 i) Topography and drainage.
Livestock house constructed should be at high elevated part than the surrounding. This prevent entering of water into the livestock house also this helps to easily remove of waste of livestock from their house hence prevents stagnation of diseases.

ii) Soil type
Soil where livestock house has to be constructed should not be too dehydrated -

4 ii) because dehydrated soil during dry season it lead to formation of cracks which leads to destruction of livestock house.

iii) Accessibility
Livestock house should be accesible in agiven area of land hence to be easily for - transporting of mater in or input and material out or output. for example easily transporting of raw materials made from the livestock which are skins, wools to the industries.



Extract 2.2: *A sample of the candidates' correct responses to Question 4.*

Extract 2.2 indicates responses from a candidate who showed competency on the mastery of the subject matter.

2.1.5 Question 5: Introduction to Crop Production

The question required the candidates to describe six principles and their importance when growing different crops in the same piece of land at different seasons. The question focused on assessing the candidates' knowledge of the principles of crop rotation.

The question was attempted by all 6,835 (100%) candidates, whereby 2,553 (37.35%) scored from 0.0 to 2.5 marks, 2,379 (34.81%) from 3.0 to 5.5 marks and 1,903 (27.84%) from 6.0 to 9.0 marks. Figure 5 portrays the distribution of the candidates' scores on the question.

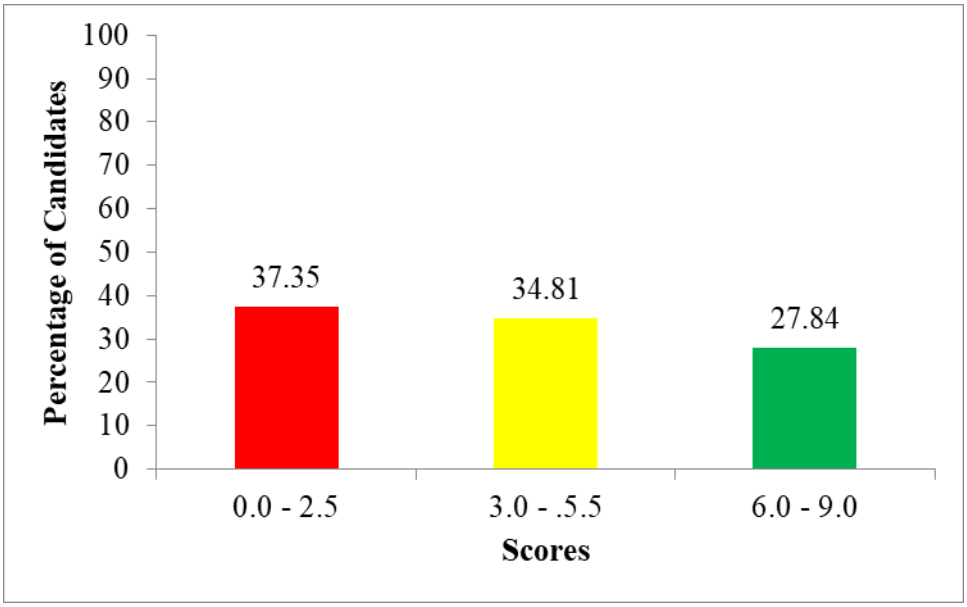
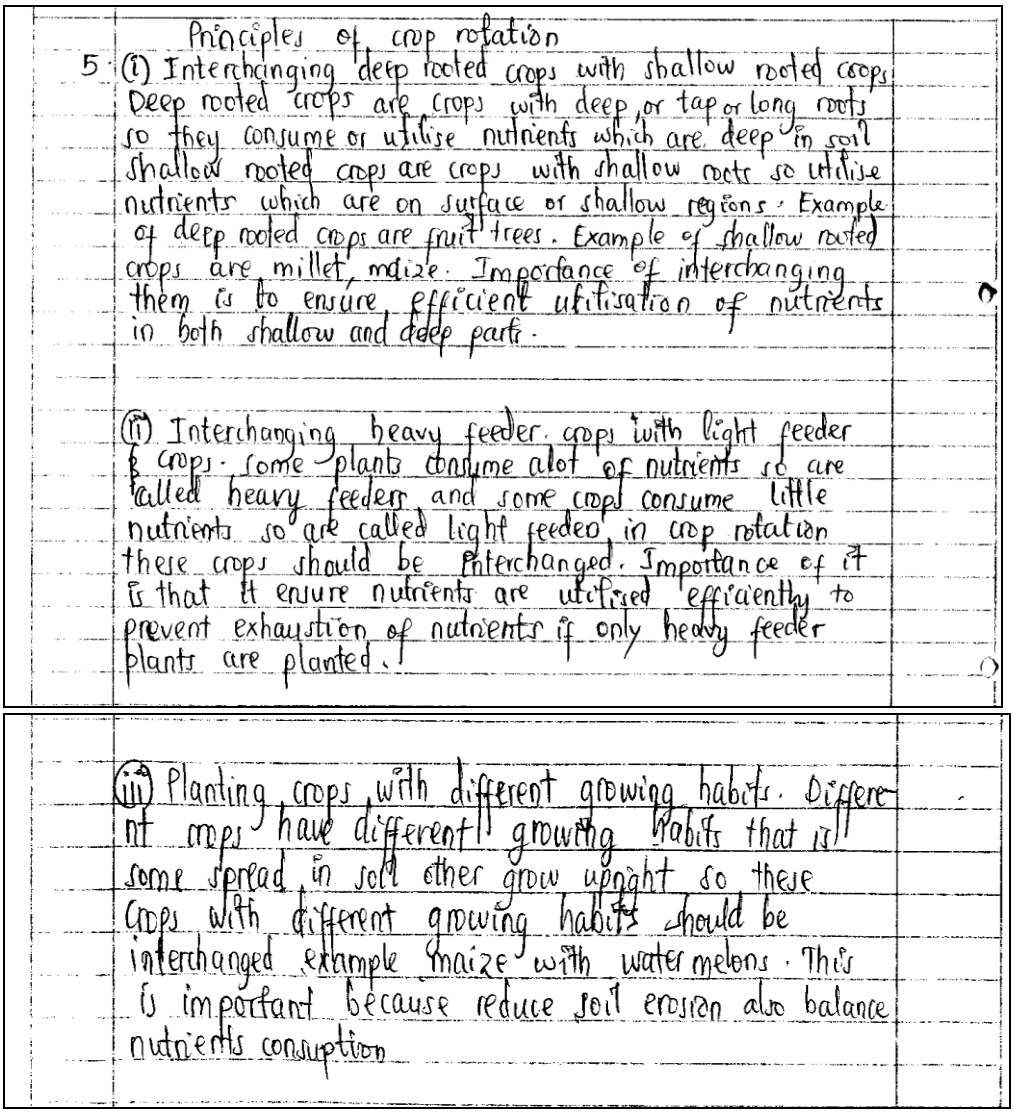


Figure 5: C*andidates' Performance on Question 5*

In view of Figure 5, 62.65 per cent of the candidates scored from 3.0 to 9.0 marks and 37.35 per cent from 0.0 to 2.5 marks. The general performance on the question was average.

Statistics show that 27.84 per cent of the candidates had good performance. Most of them managed to describe the principles of crop rotation and their importance. The correct responses provided were: (i) *interchanging crops of different growing habits; different plants have different growing habits; For example, sweet potato plants cover the soil more fully than maize or millet plants* (ii) *include legumes in the rotation; it is advisable to include leguminous plants in the rotation because it improves soil fertility* (iii) *including crops from different families; plants which are members of the same family are normally attacked by the same type of plant-insect pest and diseases causing organism. To prevent this from happening, it is advisable to plant crops of different families in successive years or seasons* (iv) *interchanging deep-rooted crops with shallow-rooted crops; inorder to get maximum benefit from the soil, it is advisable to alternate deep rooted crops with shallow rooted crop in the rotation* (v) *interchanging light feeder crops with heavy feeder crops; heavy feeder crops are crops that absorb a lot of nutrients from the soil while light feeder crops absorb only a small quantity of nutrients from the soil. Therefore, it is important to exchange these two*

types of crops (vi) *including the fallow period in the rotation; the fallow period is the period when no crops are planted in the field for one or more farming season consecutively. This will enable the soil to regain its fertility.* The candidates' correct responses is attributed to good understanding of the principles of crop rotation. Extract 3.1 depicts responses from candidate who did well in the question.

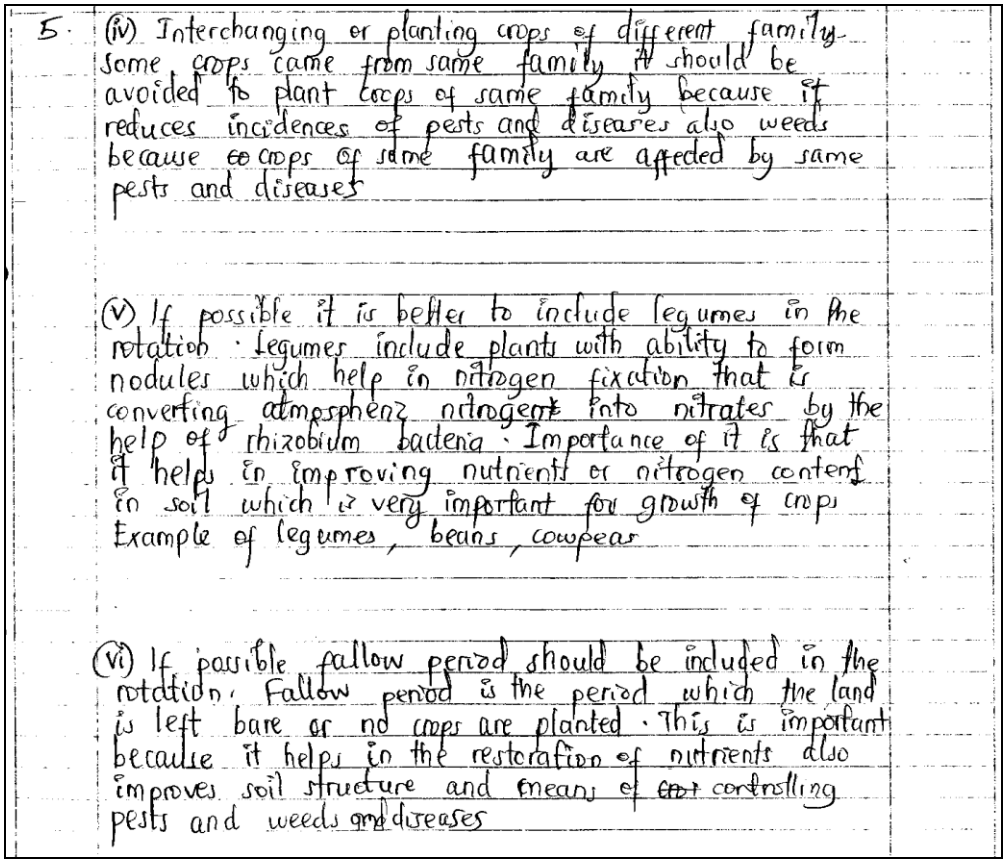


Principles of crop rotation

5. (i) Interchanging deep rooted crops with shallow rooted crops. Deep rooted crops are crops with deep, or tap or long roots so they consume or utilise nutrients which are deep in soil shallow rooted crops are crops with shallow roots so utilise nutrients which are on surface or shallow regions. Example of deep rooted crops are fruit trees. Example of shallow rooted crops are millet, maize. Importance of interchanging them is to ensure efficient utilisation of nutrients in both shallow and deep parts.

(ii) Interchanging heavy feeder crops with light feeder crops. Some plants consume alot of nutrients so are called heavy feeders and some crops consume little nutrients so are called light feeder in crop rotation these crops should be interchanged. Importance of it is that it ensure nutrients are utilised efficiently to prevent exhaustion of nutrients if only heavy feeder plants are planted.

(iii) Planting crops with different growing habits. Different crops have different growing habits that is some spread in soil other grow upright so these crops with different growing habits should be interchanged example maize with water melons. This is important because reduce soil erosion also balance nutrients consuption


5. (iv) Interchanging or planting crops of different family. Some crops came from same family it should be avoided to plant crops of same family because it reduces incidences of pests and diseases also weeds because crops of same family are affected by same pests and diseases

(v) If possible it is better to include legumes in the rotation. Legumes include plants with ability to form nodules which help in nitrogen fixation that is converting atmospheric nitrogen into nitrates by the help of rhizobium bacteria. Importance of it is that it helps in improving nutrients or nitrogen content in soil which is very important for growth of crops Example of legumes, beans, cowpeas

(vi) If possible fallow period should be included in the rotation. Fallow period is the period which the land is left bare or no crops are planted. This is important because it helps in the restoration of nutrients also improves soil structure and means of controlling pests and weeds and diseases

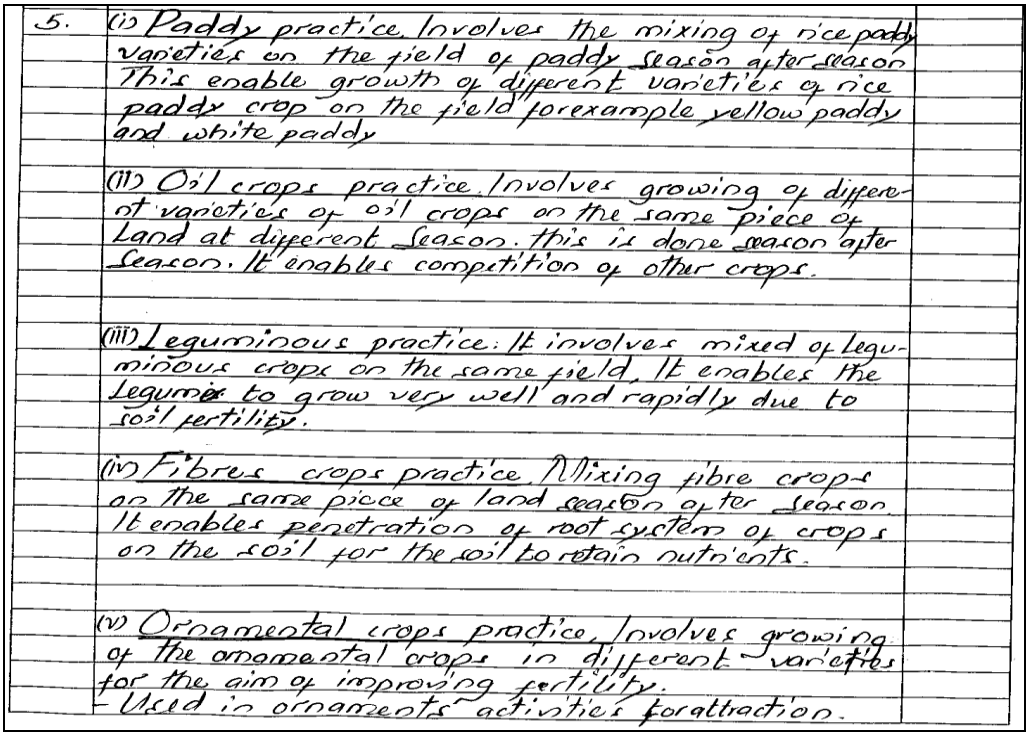
Extract 3.1: *A sample of the candidates' correct responses to Question 5.*

Extract 3.1 indicates responses from a candidate who demonstrated good understanding of the principles of crop rotation.

Moreover, 34.81 per cent of the candidates had an average performance. Most of them were able to state the principles of crop rotation but failed to describe their importance. This implies they had insufficient knowledge of the principles of crop rotation.

Nevertheless, 37.35 per cent of the candidates had a weak performance. The majority failed to describe the principles of crop rotation and their importance. Some of the candidates provided the principles of crop production instead of those for crop rotation. Some of the incorrect responses given were; *choice of suitable land*, *soil conservation*, *moisture supply*, *weeding*, *disease* and *pest control* and *storage*. Others prepared crop rotation plans instead of giving principles of crop rotation. An example of crop rotation plan provided was; first year - grow maize, second year - grow cotton, third year - grow beans and forth

year - fallow the land. All these incorrect responses justify failure to understand the demand of the question. Extract 3.2 represents a sample of incorrect responses to the question.


5. (i) Paddy practice. Involves the mixing of rice paddy varieties on the field of paddy season after season. This enable growth of different varieties of rice paddy crop on the field forexample yellow paddy and white paddy

(ii) Oil crops practice. Involves growing of different varieties of oil crops on the same piece of land at different season. this is done season after season. It enables competition of other crops.

(iii) Leguminous practice: It involves mixed of leguminous crops on the same field. It enables the legumes to grow very well and rapidly due to soil fertility.

(iv) Fibres crops practice. Mixing fibre crops on the same piece of land season after season. It enables penetration of root system of crops on the soil for the soil to retain nutrients.

(v) Ornamental crops practice. Involves growing of the ornamental crops in different varieties for the aim of improving fertility.
- Used in ornaments activities forattraction.

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

Extract 3.2 exemplifies responses from a candidate who lacked the knowledge of the subject matter. The candidate classified crops instead of describing the principles of crop rotation.

2.1.6 Question 6: Introduction to Soil Science

The question consisted of parts (a) and (b). The candidates were required to: (a) explain in four points the process through which soil profile is formed and (b) explain the effects of five factors on soil development. The question tested the candidates' understanding of the concept of soil formation.

The question was attempted by all 6,835 (100%) candidates, of which 3,484 (50.97%) scored from 0.0 to 2.5 marks, 2,603 (38.09%) from 3.0 to 5.5 marks and 749 (10.94%) from 6.0 to 9.0 marks. Figure 6 presents the distribution of candidates' scores on the question.

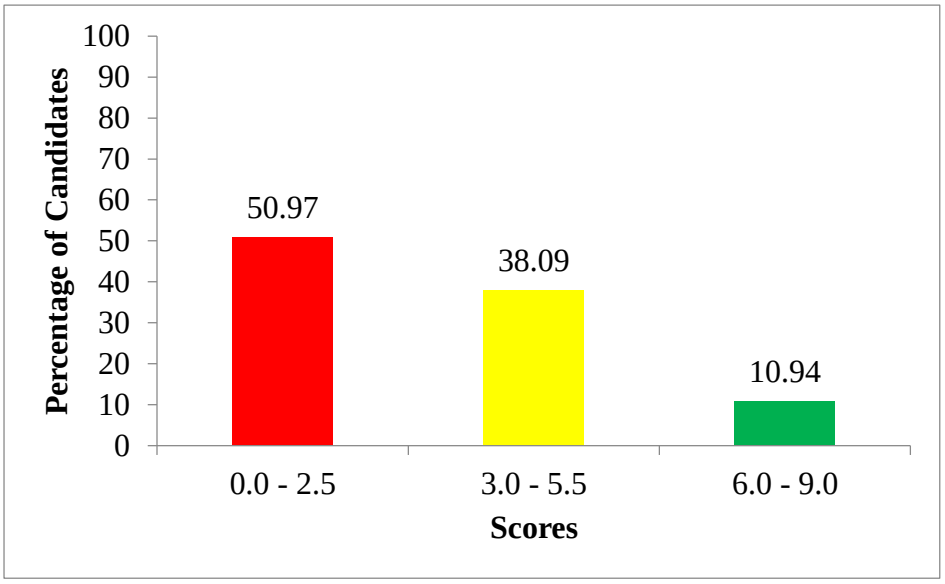


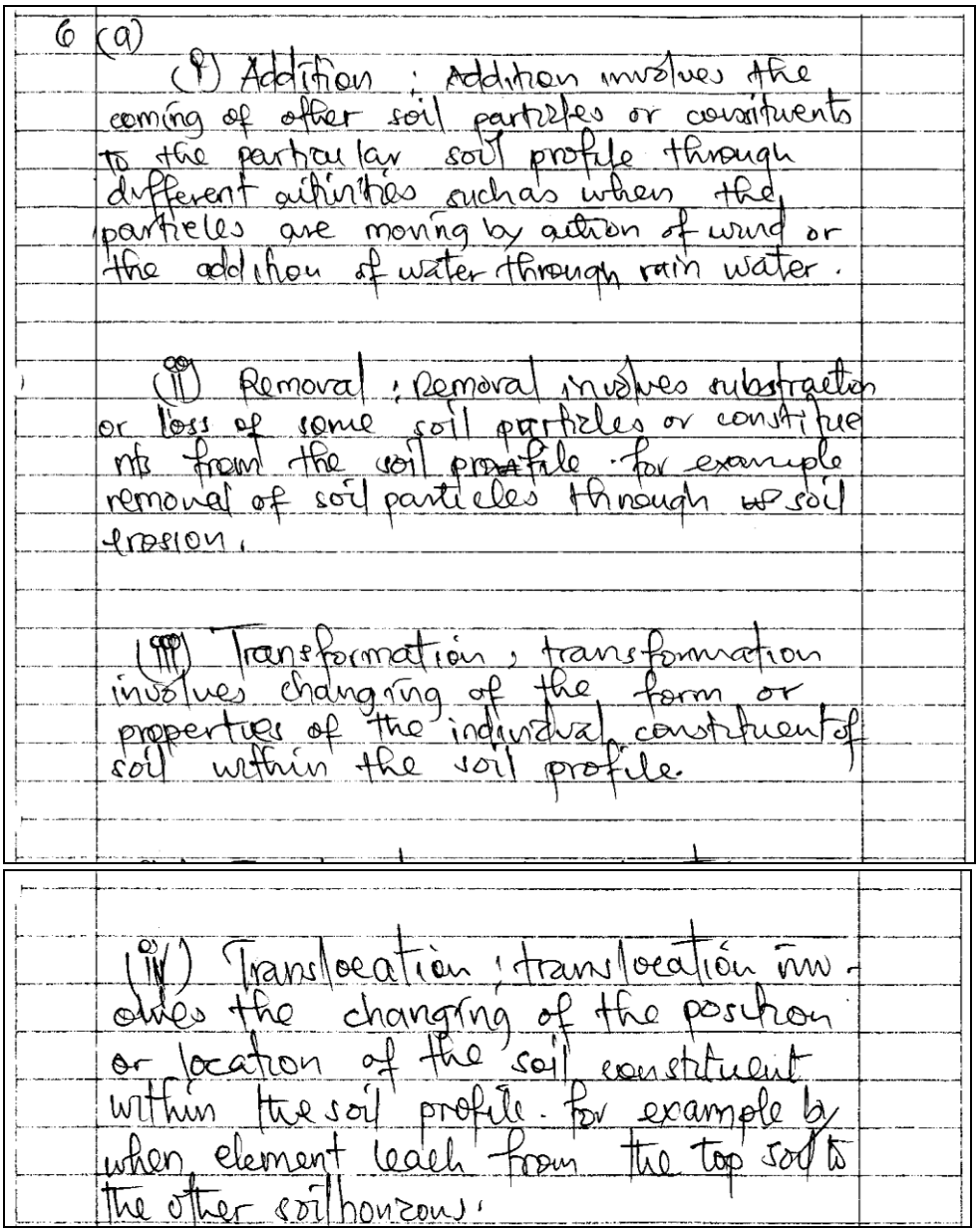
Figure 6: C*andidates' Performance on Question 6*

Figure 6 shows 49.03 per cent of the candidates scored from 3.0 to 9.0 marks while 50.97 per cent of the candidates from 0.0 to 2.5 marks. The candidates' performance on the question was average.

Data indicate that 10.94 per cent of the candidates had good performance. The majority attempted correctly both parts of the question. In part (a), the candidates were able to explain the processes involved in the formation of soil horizons. Examples of such correct responses from the candidates include: (i) *addition; this includes actions that add materials to the soil profile* (ii) *losses; these are removal of components from soil profile* (iii) *translocations; involves moving components within the soil horizons without leaving the profile and (iv) transformation; under transformation, one component changes to another*.

In part (b), the candidates managed to explain how each factor of soil formation contributes to the soil development processes. Such responses include; (i) *climate; which includes all aspects such as rainfall, temperature, snow fall, wind and amount of sunlight*, and *living organisms* (ii) *soil organisms such as plant roots, burrowing animals and micro-organisms that speed up the breakdown of large soil particles into smaller ones* (iii) *topography; topography or slope position of a land can greatly influence soil*

development (iv) *parent material; many of the soil properties are inherited from the material from which they are formed and* (v) *time; the time determines how long the factors of soil formation have been at work in weathering the parent materials*. The responses provided indicates mastery of the concept of soil formation. Extract 4.1 presents responses from a candidate who did well on the question.



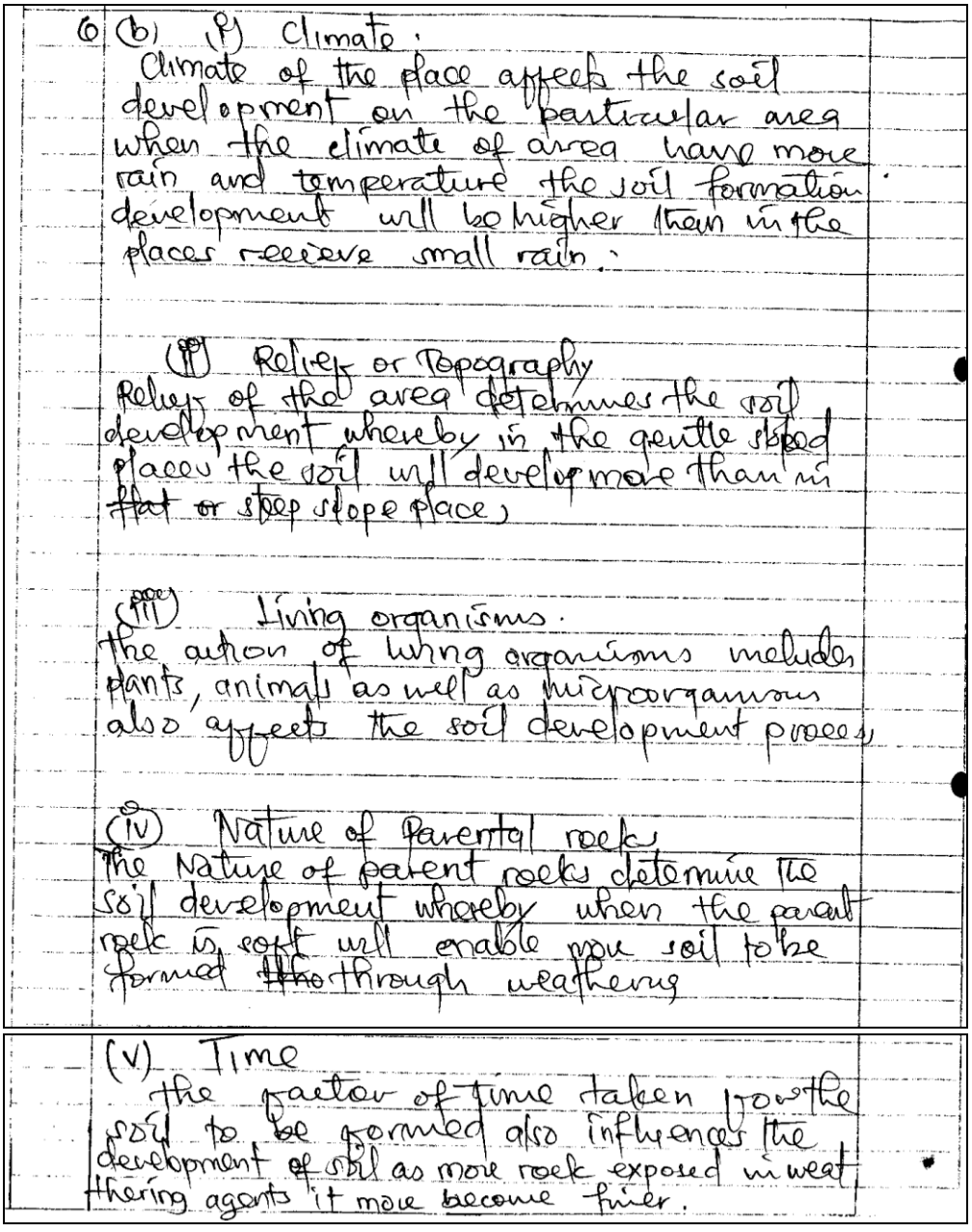
6 (a)

(i) Addition : Addition involves the coming of other soil particles or constituents to the particular soil profile through different activities such as when the particles are moving by action of wind or the addition of water through rain water.

(ii) Removal : Removal involves substraction or loss of some soil particles or constituents from the soil profile. for example removal of soil particles through soil erosion.

(iii) Transformation : transformation involves changing of the form or properties of the individual constituent of soil within the soil profile.

(iv) Translocation : translocation involves the changing of the position or location of the soil constituent within the soil profile. for example by when element leach from the top soil to the other soil horizons.


6 (b) (i) Climate.
Climate of the place affects the soil development on the particular area when the climate of area have more rain and temperature the soil formation development will be higher than in the places receive small rain.

(ii) Relief or Topography
Relief of the area determines the soil development whereby in the gentle sloped places the soil will develop more than in flat or steep slope place.

(iii) living organisms.
The action of living organisms includes plants, animals as well as microorganisms also affects the soil development process.

(iv) Nature of Parental rock
The Nature of parent rocks determine the soil development whereby when the parent rock is soft will enable new soil to be formed through weathering

(v) Time
the factor of time taken for the soil to be formed also influences the development of soil as more rock exposed in weathering agents it more become finer.

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

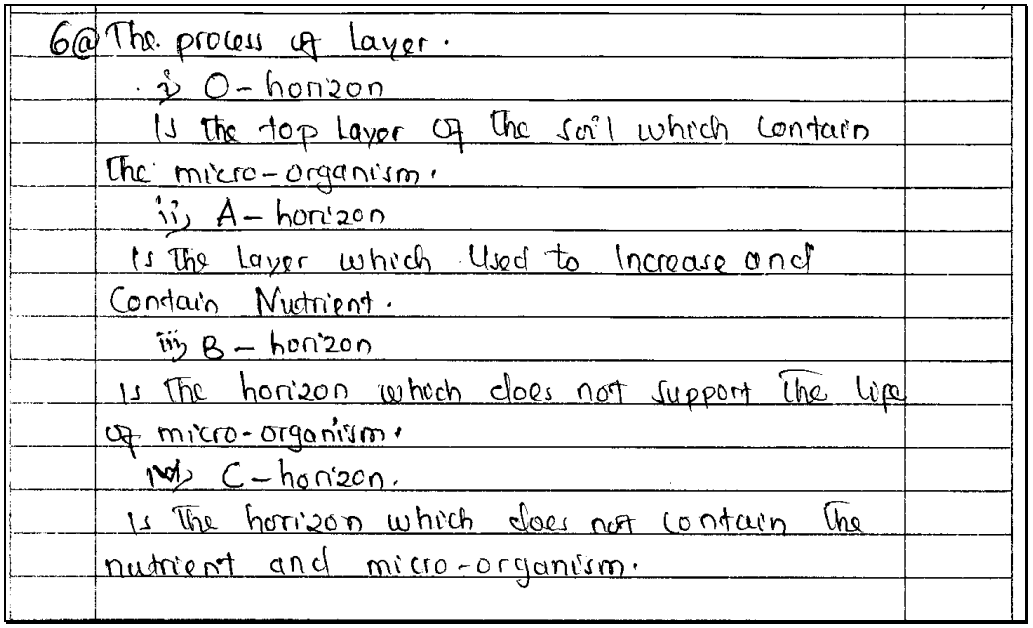
Extract 4.1 indicates responses from a candidate who demonstrated good understanding of the concept of soil formation.

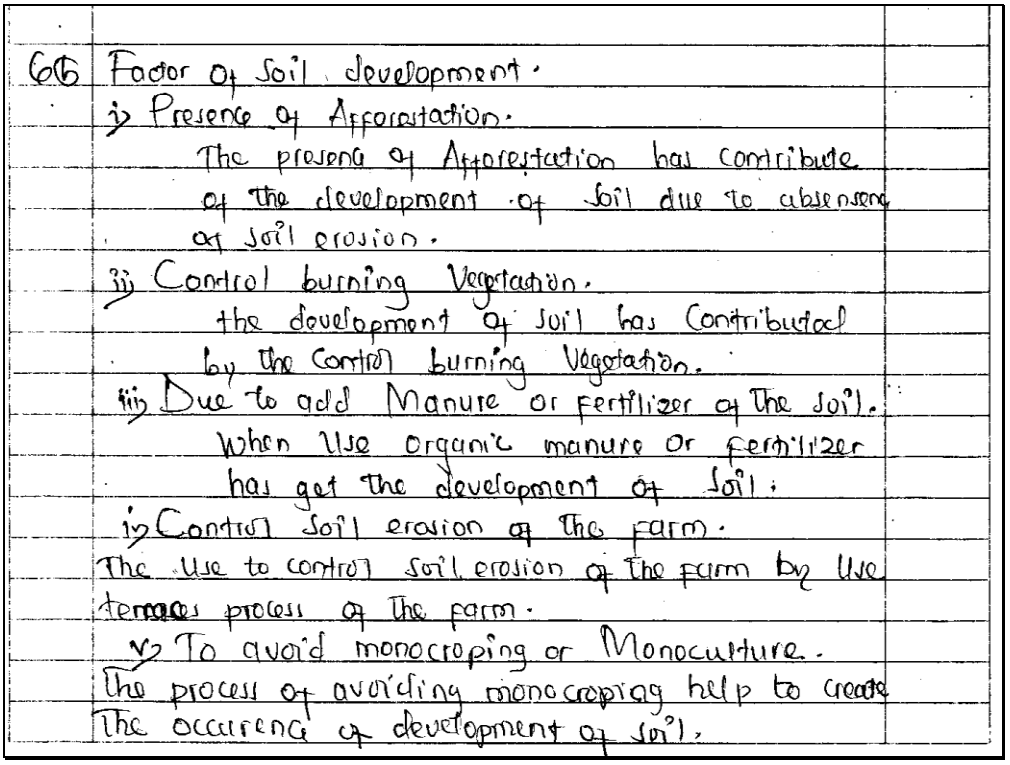
The candidates who had average performance were 38.09 per cent. The majority managed to provide correct responses in part (a). In part (b), they were able to name the factors affecting soil formation but failed to give correct

explanations. This indicates possession of inadequate knowledge of the subject matter.

On contrary, 50.97 per cent of the candidates had a weak performance. Most of them provided incorrect responses in almost all parts of the question. In part (a), they were unable to explain the process of the soil profile formation. Some of them explained the process of chemical weathering instead of the processes of soil profile formation. Others described the horizons of the soil profile contrary to the demand of the question. Furthermore, other candidates provided variety of incorrect responses such as; *it is formed by humus, it is formed by cold rocks, it is formed due to high temperature to the soil, formed due to type of soil and formed due to soil depth*..

Similarly, in part (b) they were unable to explain how each factor of soil formation contributes to the soil development. Some of them provided agents of soil erosion such as *water*, *wind*, *animals* and *gravity*. Others explained soil physical properties like *soil texture*, *soil structure*, *soil density* and *soil porosity* and *soil air*. The responses provided depict lack of knowledge of the concept of soil formation. Extract 4.2 portrays the responses from a candidate who lacked knowledge of the subject matter.


6@ The process of layer.
i) O-horizon
Is the top layer of the soil which contain the micro-organism.
ii) A-horizon
Is the layer which used to increase and contain Nutrient.
iii) B-horizon
Is the horizon which does not support the life of micro-organism.
iv) C-horizon.
Is the horizon which does not contain the nutrient and micro-organism.


6(b) Factor of soil development.
i) Presence of Afforestation.
The presence of Afforestation has contribute of the development of soil due to absensence of soil erosion.
ii) Control burning Vegetation.
the development of soil has Contributed by the Control burning Vegetation.
iii) Due to add Manure or fertilizer of the soil.
When Use organic manure or fertilizer has get the development of soil.
iv) Control soil erosion of the farm.
The Use to control soil erosion of the farm by Use terraces process of the farm.
v) To avoid monocroping or Monoculture.
The process of avoiding monocroping help to create The occurence of development of soil.

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

Extract 4.2 indicates responses from a candidate who demonstrated lack of understanding of the concept of soil formation. For example, in part (a) the candidate tried to describe the horizons in the soil profile instead of the process of its formation.

2.1.7 Question 7: Farm Structures

The question had parts (a) and (b). The candidates were required to: (a) explain the uses of the following building materials (i) bricks (ii) aggregates (iii) timber (iv) thatch grass and (b) explain five factors to be considered when designing a farm structure. The question assessed the candidates' knowledge and skills of farm structures.

The question was attempted by all 6,835 (100%) candidates, among them 3,632 (53.14%) scored from 0.0 to 2.5 marks, 2,474 (36.19%) from 3.0 to 5.5 marks and 729 (10.67%) from 6.0 to 9.0 marks. Figure 7 illustrates the distribution of candidates' scores on the question.

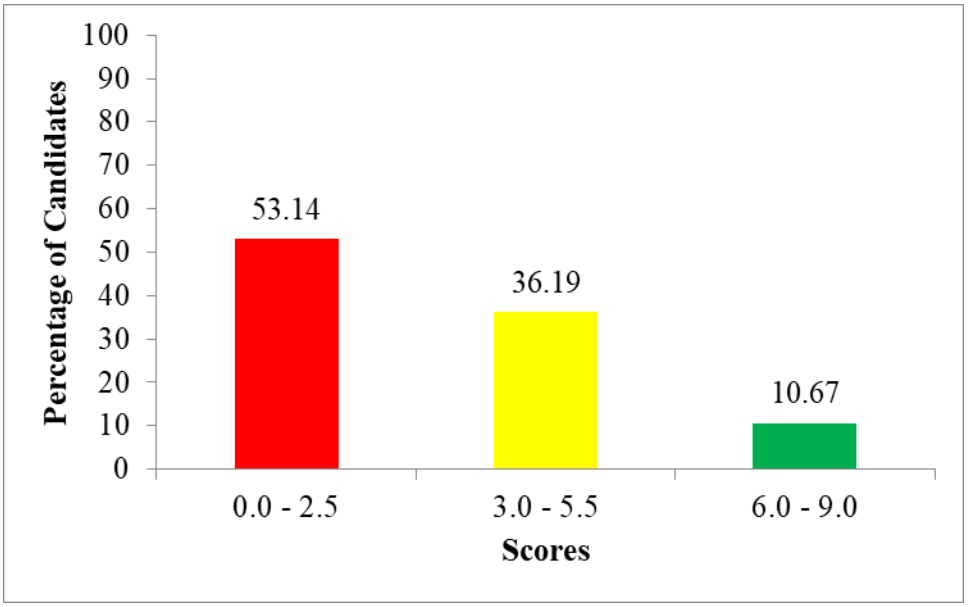


Figure 7: C*andidates' Performance on Question 7*

Figure 7 shows that 46.86 per cent of the candidates scored from 3.0 to 9.0 whereas 53.14 per cent of the candidates from 0.0 to 2.5 marks. This is generally average performance.

Data analysis indicates 10.67 per cent of the candidates did well on the question. The majority of them responded correctly to both parts of the question. In part (a), they were able to explain the uses of each of the named building materials. For example, (i) bricks; *these are the most common construction materials for making walls, columns, pavements and to some extent floors*, (ii) aggregates; *these are construction materials produced mainly from crushed rocks. They are mixed with the right proportions of sand, water and cement to make floors, walls, columns and beams of various farm structures*, (iii) timber; *timber is used for the construction of doors, windows, roofs, beams* and *fencing posts*, (iv) thatch grass; *is used for roofing*. This suggests they were conversant with the uses of the building materials.

Likewise, in part (b) they managed to explain the factors to be considered when designing a farm structure. Examples of such correct responses were; the *intended purpose or use of the structure, a farm structure should be designed to withstand the load to which it will be subjected, a farm structure should be carefully designed to meet the scale of the intended farming activity, designer of*

a farm structure should bear in mind the costs of the complete structure, a design should allow any alteration to be made in the proposed enterprise with minimum cost. Their responses show that the candidates had a good understanding of the factors to consider when designing farm structures. Extract 5.1 exemplifies responses from the candidate with good performance.

7@ (i) Brick
→ These are used as construction material, for making wall columns, pavement and to some extent floor.

(ii) Aggregates
These are used in Construction to make a Concrete floors, wall and the columns they are mixed with Right proportions of Sand, water and Cements

(iii) Timber.
Is used in Construction of door windows, roofs, beams, fencing post and partioning of livestock houses.

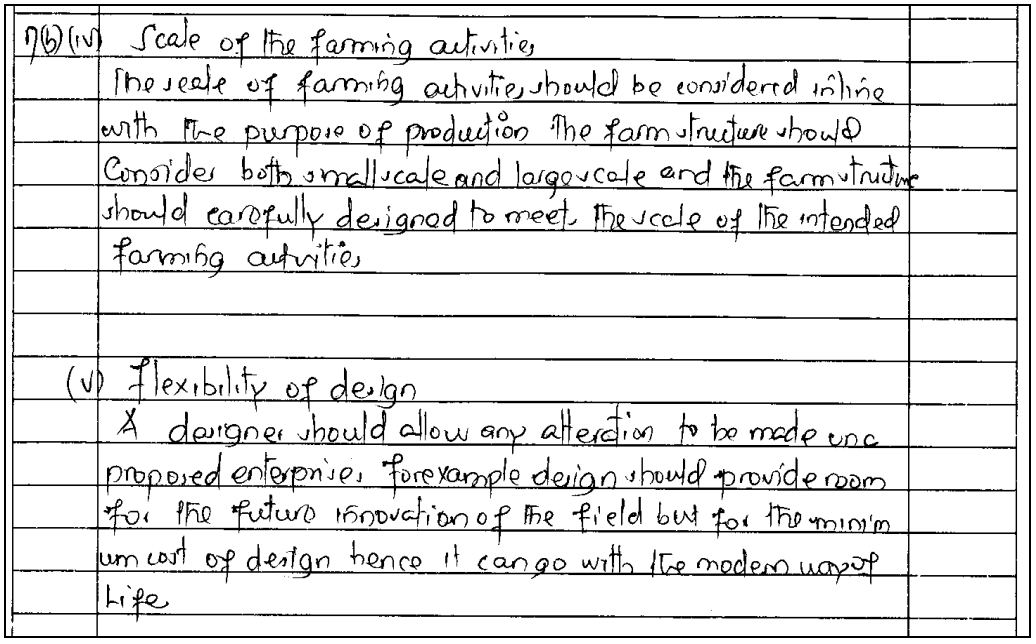
7@(iv) Thatch grasses
There are grasses that are used for the thatching roofs. This are ideal for the construction of Specialized structure such as Mushroom production houses.

7(b) The following are the Considerations during farm structure Construction

(i) Intended use of the structure
Different enterprises have different requirements in terms of Space, temperature, light, safety condition, physical protection and many other it is therefore important for the designers to fully understand the purposes of the intended structure

(ii) Load consideration
The farmer structure should be designed to the ability that it can withstand loads to which are subjected farm structure can handle both dead and livestock. The dead loads includes weights of the material, used in construction stones, Concrete, but live load includes machineries and equipments. Therefore it is important to construct, the desired farm structure.

(iii) Economy of Construction
The farm structure should be constructed into both quality and at minimum cost hence the designer should the consider the cost of construction so as the price used doesn't compromise the project capital. hence the farmer can construcde good and desired structure at minimum cost.


7(b)(iv) Scale of the farming activities
The scale of farming activities should be considered inline with the purpose of production The farm structure should Consider both small scale and large scale and the farm structure should carefully designed to meet the scale of the intended farming activities

(v) Flexibility of design
A designer should allow any alteration to be made on a proposed enterprises forexample design should provide room for the future innovation of the field but for the minimum cost of design hence it can go with the modern way of life

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

Extract 5.1 indicates responses from a candidate who demonstrated good understanding of the subject matter.

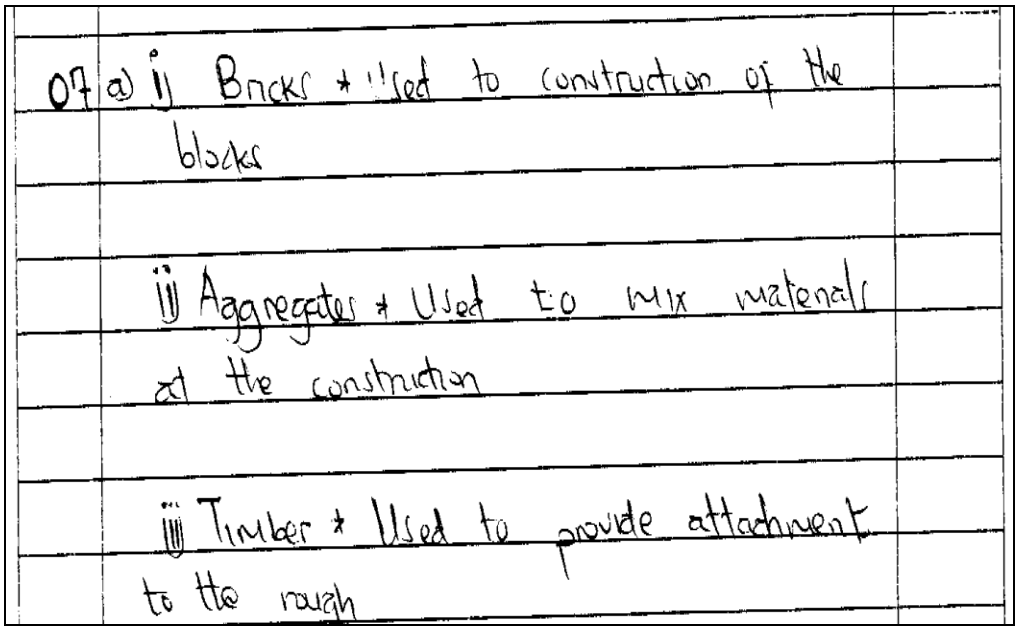
Furthermore, 36.19 per cent of the candidates performed averagely on the question. Most of them were able to explain the uses of the building materials in part (a). This implies good understanding of the subject matter.

In part (b), they failed to give the factors to be considered when designing a farm structure. The majority of the candidates provided factors to consider when selecting a site for farm structure such as; *availability of water, it should be free from wind, consider type of soil, area should be accessible, consider the climate of the place, and transportation and marketing*. This signifies they had different understanding of the concept.

However, 53.14 per cent of the candidates had a weak performance. Majority of them attempted incorrectly both parts of the question. In part (a), they failed to provide correct explanations for the uses of the named building materials. Examples of incorrect responses provided were; bricks *are used to mark temporary point on the land, bricks are used to measure the length and weight, bricks are used to connect the wall in order to breakdown, bricks help to cover*

the building space and bricks are used to make a large thing into a large particle. Aggregates *are used to combine one brick to another, used to control the foundation of the house, it is used to catch timbers when building, it is used the farm structure when it is in primary construction, and it is used in measuring distance*. Timber *is used for cutting by using cross cut saw, to protect the house against rainfall and sun, used for construction material, used to protect the large animal, which affect the crops and used to construct primary of the house*. Thatch grass is *used to measure the flat wall when building, used for cutting grass, used as habitat for people and used to cover the soil*. Their responses indicate possession of poor knowledge and skills of the building materials.

Similarly, in part (b) the candidates were unable to give the factors to be considered when designing a farm structure. Most of them provided a variety of incorrect responses such as *presence of map, which show the areas of the farm, availability of expertise for construction, availability of material for designing farm structure, durability of building material, depth of foundation and types of bricks to use*. The incorrect responses provided in both parts prove the candidates had a poor understanding of the subject matter. Extract 5.2 is an example of responses from a candidate who had a weak performance on the question.



(ii) Thatch grass * Used to maintain the moisture within the soil.

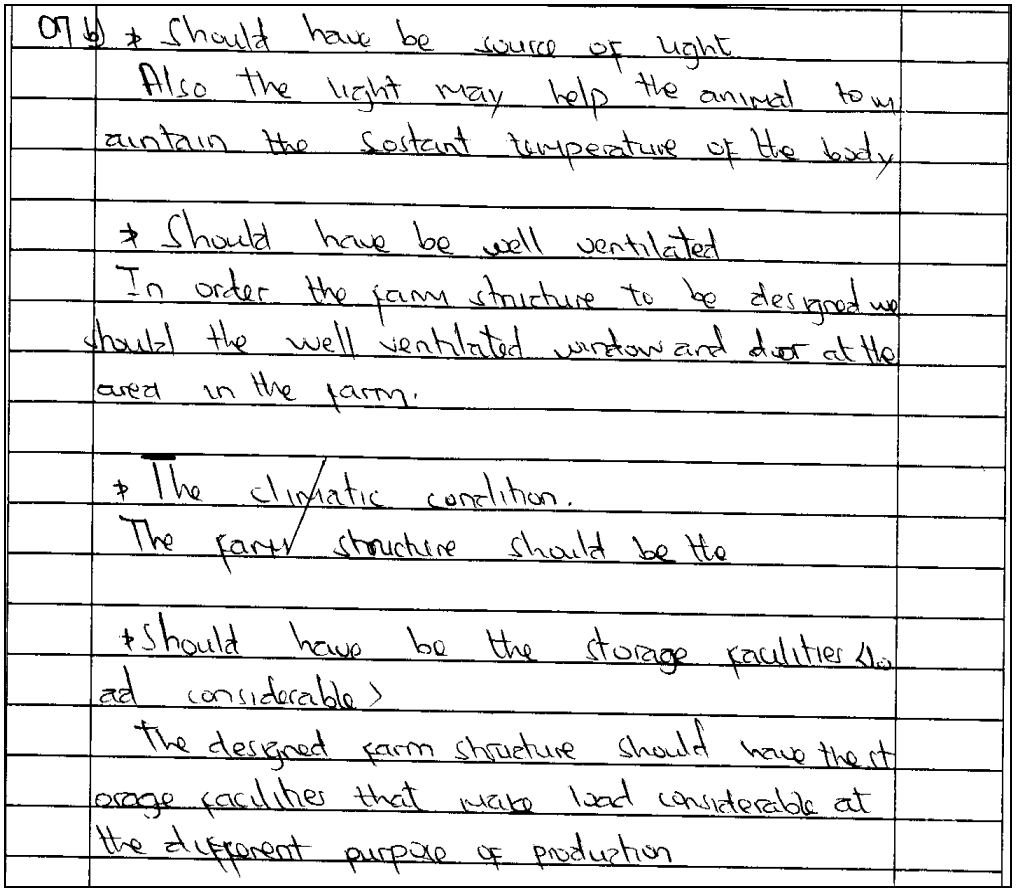
b) Factor to consider when designing a farm structure

* Should be have roughed floor

In order the farm structure should have the floor that way reduce the accident

* Should have be water supply

Also the farm structure should have the available of water at the area and that may be at farm structure.



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

Extract 5.2 illustrates responses from a candidate who attempted incorrectly both parts of the question signifying lack of the subject matter knowledge.

2.1.8 Question 8: Contemporary Issues in Agriculture

The question required the candidates to give six reasons why farmers should practice sustainable agriculture production. The question tested candidates' knowledge and skills of the concept of sustainable agriculture.

The question was attempted by 6,835 (100%) candidates whereby 5,462 (79.91%) scored from 0.0 to 2.5 marks, 1,041 (15.23%) from 3.0 to 5.5 marks and 332 (4.86%) from 6.0 to 9.0 marks. Figure 8 summarises the distribution of candidates' scores on the question.

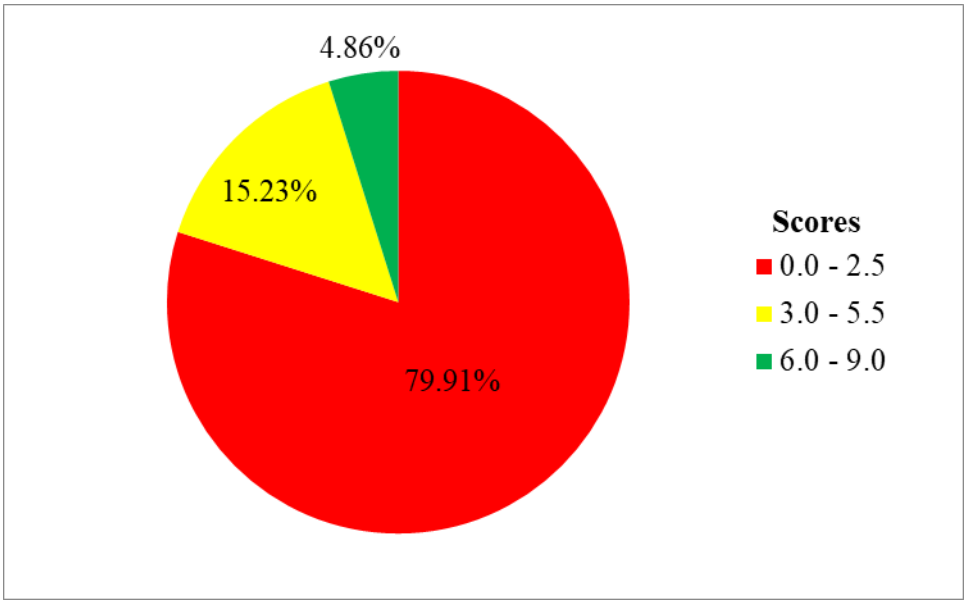
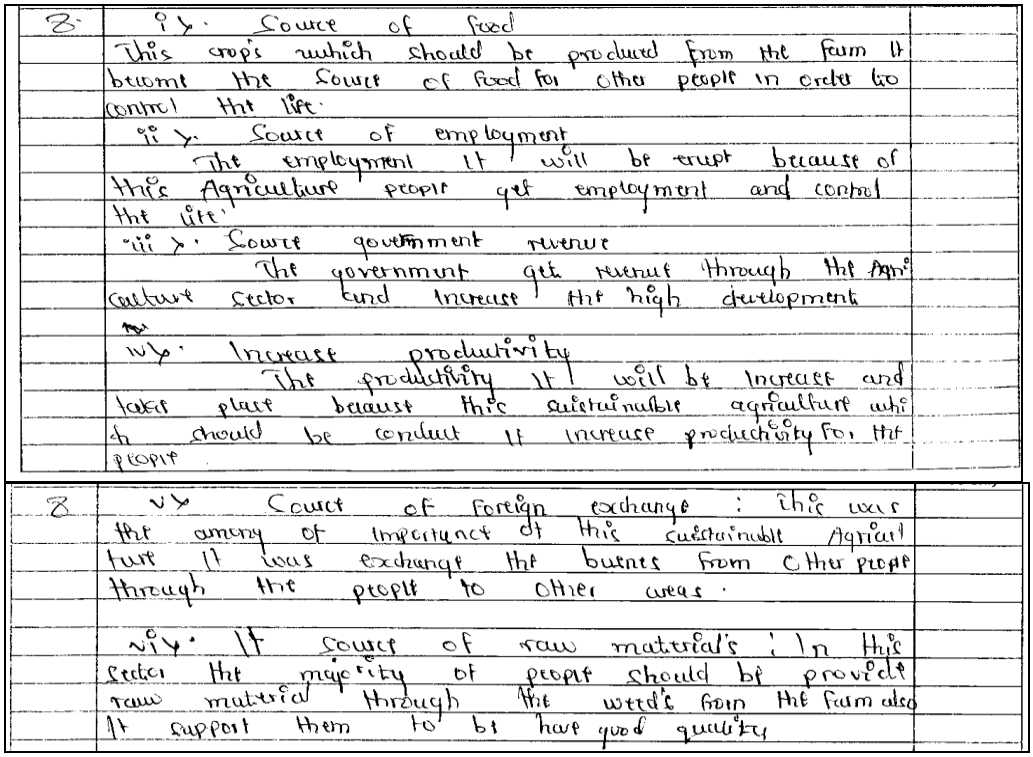


Figure 8: C*andidates' Performance on Question 8*

Figure 8 shows that 79.91 per cent of the candidates scored from 0.0 to 2.5 marks and 29.09 per cent from 3.0 to 9.0 marks. The general performance of the question was weak.

Data depict that 79.91 per cent of the candidates did poorly on the question. The majority failed to give reasons why farmers should practice sustainable agriculture production. Majority of them provided the importance of agriculture instead of reasons why farmers should practice sustainable agriculture. Examples of such incorrect responses include; *it is a source of employment, it is a source of raw materials to industries, it is a source of income, it is a source of livelihood of the people, it is a source of national economy* and *it provides market for industrial goods*. Some tried to explain the meaning of sustainable agriculture and others gave branches of agriculture like; *horticulture*, *apiculture*, *floriculture*, *aquaculture* and *silviculture*. The candidates' responses signify lack of understanding of the concept of sustainable agriculture. Extract 6.1 represents a sample of incorrect responses on the question.

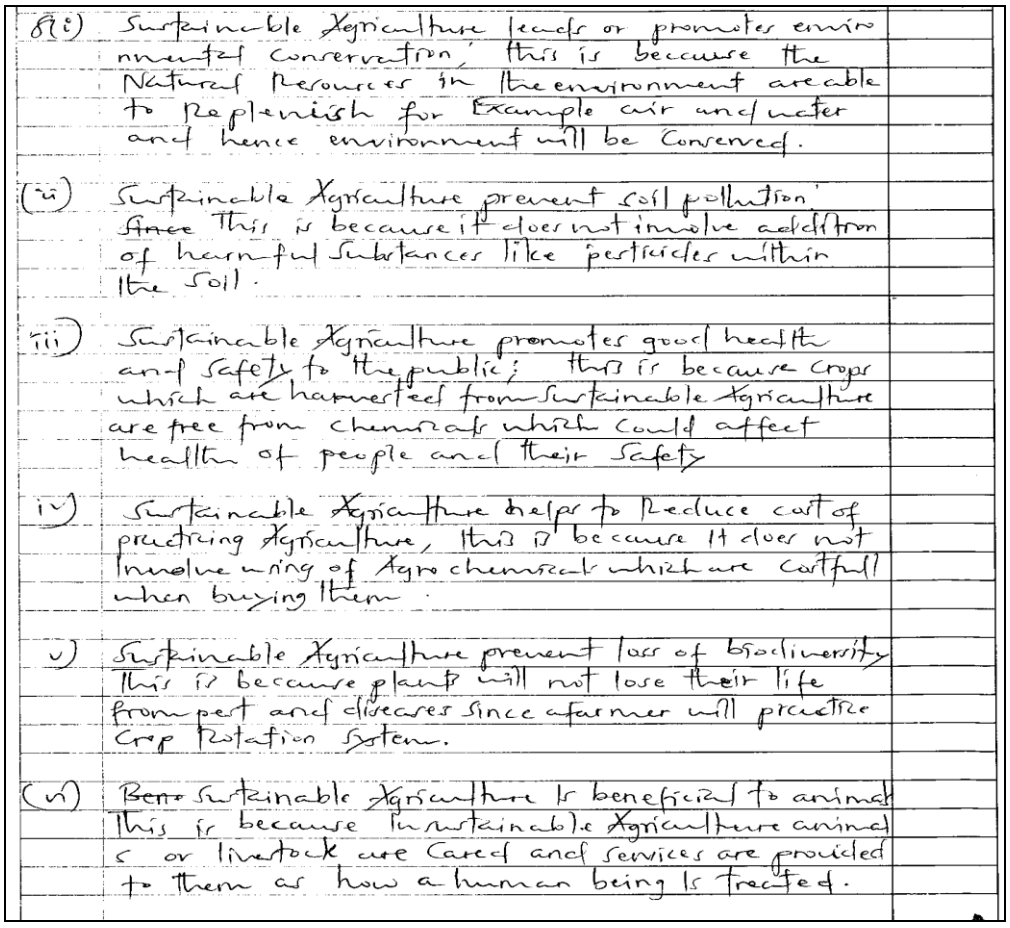


Extract 6.1*: A sample of the candidates' incorrect responses to Question 8.*

Extract 6.1 indicates responses from a candidate who provided the importance of agriculture instead of reasons for practicing sustainable agriculture. This justifies possession of inadequate knowledge of the subject matter.

The candidates who performed averagely were 15.23 per cent. The majority were unable to exhaust all the reasons for practicing sustainable agricultural production indicating partial understanding of the concept.

Nevertheless, 4.86 per cent of the candidates had good performance on the question. Most of them managed to give reasons for practicing sustainable agriculture. They provided correct responses like; *contribution to environmental conservation, promoting public health and safety, preventing soil pollution, reduction in farming costs, enhancing biodiversity, beneficial to animals and beneficial to the environment.* Their responses justify possession of adequate knowledge and skills of the concept of sustainable agriculture. Extract 6.2 portrays an example of responses from a candidate who had good performance.


8(i) Sustainable Agriculture leads or promotes environmental conservation, this is because the Natural Resources in the environment are able to Replenish for Example air and water and hence environment will be Conserved.

(ii) Sustainable Agriculture prevent soil pollution since this is because it does not involve addition of harmful substances like pesticides within the soil.

(iii) Sustainable Agriculture promotes good health and safety to the public; this is because Crops which are harvested from Sustainable Agriculture are free from chemicals which could affect health of people and their safety

iv) Sustainable Agriculture helps to Reduce cost of practising Agriculture, this is because it does not involve using of Agro chemicals which are costfull when buying them.

v) Sustainable Agriculture prevent loss of biodiversity this is because plants will not lose their life from pest and diseases since a farmer will practise Crop Rotation System.

(vi) Bcos Sustainable Agriculture is beneficial to animals this is because In sustainable Agriculture animals or livestock are Cared and services are provided to them as how a human being is treated.

Extract 6.2: *A sample of the candidates' correct responses to Question 8.*

Extract 6.2 shows responses from candidates who exhibited good mastery of the subject matter.

2.1.9 Question 9: Principles of Crop Production

The candidates were required to account for six agronomic methods to address the problem of soil fertility that affect crop plant growth. The question tested the candidates understanding of the methods of maintaining soil fertility.

The question was opted by all 6,137 (89.79%) candidates of whom 1,006 (16.39%) scored from 0.0 to 4.0 marks, 3,971 (64.71%) from 4.5 to 9.5 marks and 1,160 (18.90%) from 10 to 15 marks. Figure 9 presents the distribution of candidates' scores on the question.

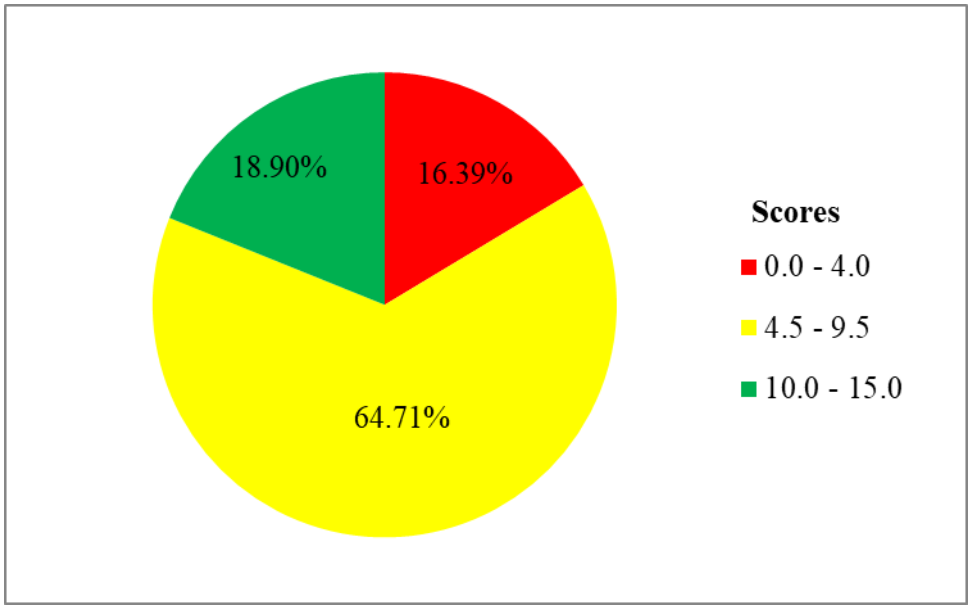


Figure 9: C*andidates' Performance on Question 9*

Referring to Figure 9, 83.61 per cent of the candidates scored from 4.5 to 15 marks while 16.39 per cent from 0.0 to 4.0 marks. The performance of the candidates on the question was generally good.

The candidates who performed well in the question were 18.90 per cent. Most of them managed to account for the agronomic methods to address the problem of soil fertility that affects crop plant growth. The correct responses provided were; *crop rotation, mulching, use of cover crops, green manuring, minimum tillage, weeding, liming, proper drainage, intercropping (mixed cropping), contour farming, strip cropping and use of grass strips, afforestation* and *use of wind breaks, use of proper spacing* and *use of proper grazing.* This shows the competence of the candidates on the mastery of the methods of maintaining soil fertility. In addition, the candidates demonstrated good essay writing skills. Extract 7.1 is an example of responses from a candidate who attempted the question correctly.

SECTION C (30 Marks):

09. Agronomic methods; Are practices which are practiced or done by the farmer in the field in order to maintain soil fertility. Soil fertility is the ability of the soil to provide the nutrients to the plants in adequate amounts and suitable proportions. The following are agronomic methods for addressing problem

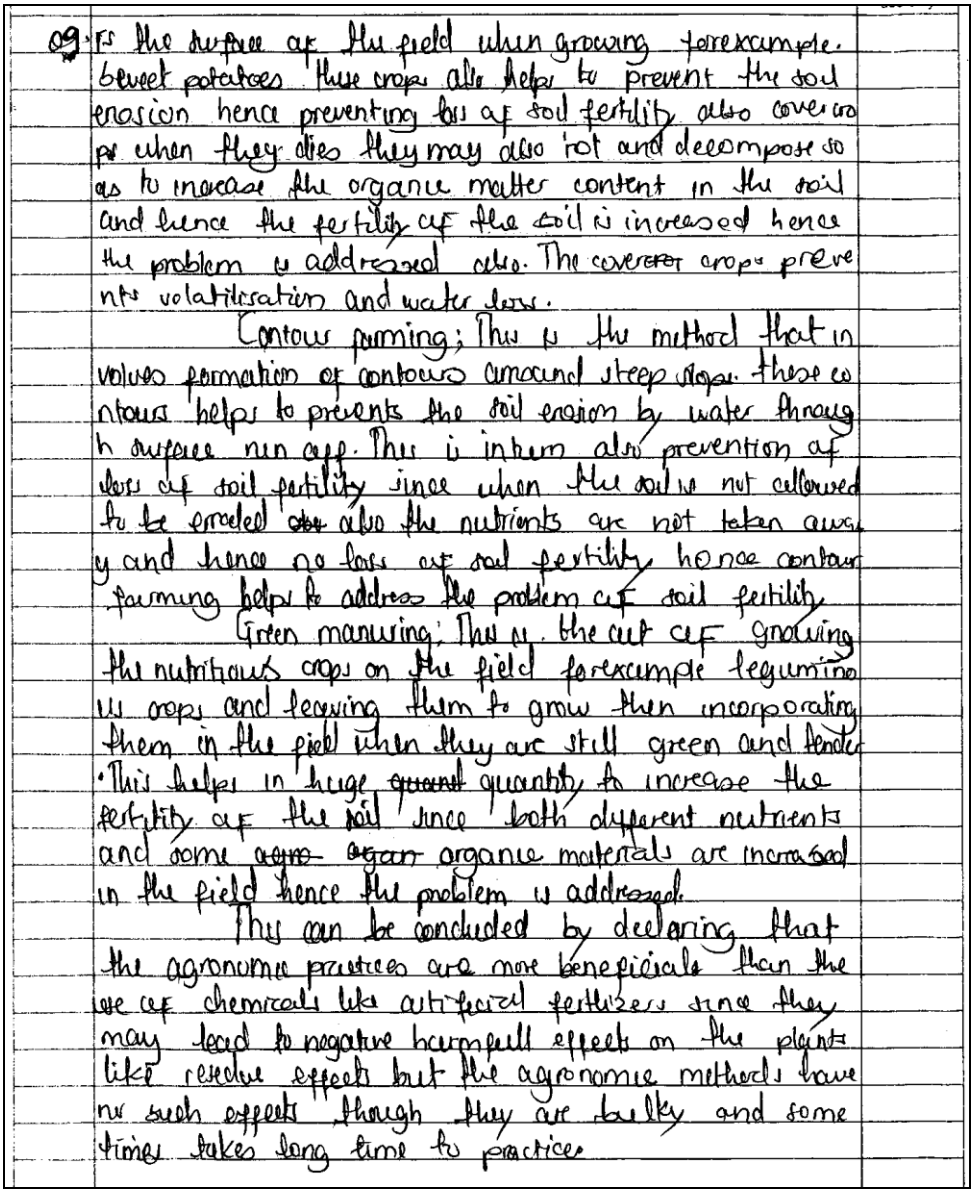
09 of soil fertility

Crop rotation; Is the practice of growing different types of crops on the same field year after year. On the principle of this the inclusion of legumes in the rotation is encouraged here when they are included in the rotation they increase the amount of the soil nitrogen since they converts the atmospheric nitrogen to nitrate that is absorbable to the plants and this is by the help of the bacterias contained in their root nodules hence crop rotation helps to increase the soil fertility.

Liming; This is the act of applying the agricultured limes on the acidic soils so as to amend their PH. The limes contains the basic compounds such as the oxye oxides and hydroxide of calcium and magnesium which when they are applied on the acidic soil they neutralizes it hence increasing its PH hence improving the fertility of that soil since some times in too acidic soil some nutrients becomes fixed and hence not available to the plants so by liming then the problem of soil fertility is addressed.

Mulching; Is the act of spreading off the mulch materials on the surface of the land. The mulch materials may be organic or inorganic for example the grasses and farm residues are organic mulches but polythene sheets are inorganic mulches. The act of doing mulching on the field prevents the soil erosion in with this also it prevents loss of soil fertility also at the same time helps to maintain soil moisture by preventing evaporation and it prevent volatilization that would lead to loss of soil nutrients hence the problem of soil fertility is addressed.

Use of cover crops; These are crops that cove


09. Is the surface of the field when growing forexample. beweet potatoes. These crops also helps to prevent the soil erosion hence preventing loss of soil fertility also cover crop when they dies they may also rot and decompose so as to increase the organic matter content in the soil and hence the fertility of the soil is increased hence the problem is addressed also. The cover crops preve nts volatilisation and water loss.

Contour farming; This is the method that in volves formation of contours araound steep slops. these co ntours helps to prevents the soil erosion by water throug h surface run off. This is inturn also prevention of loss of soil fertility since when the soil is not allowed to be eroded also the nutrients are not taken awa y and hence no loss of soil fertility hence contour farming helps to address the problem of soil fertility.

Green manuring; This is the act of growing the nutritious crops on the field forexample leguminos us crops and leaving them to grow then incorporating them in the field when they are still green and tender. This helps in huge ~~quant~~ quantity to increase the fertility of the soil since both different nutrients and some ~~orga~~ organic organic materials are increased in the field hence the problem is addressed.

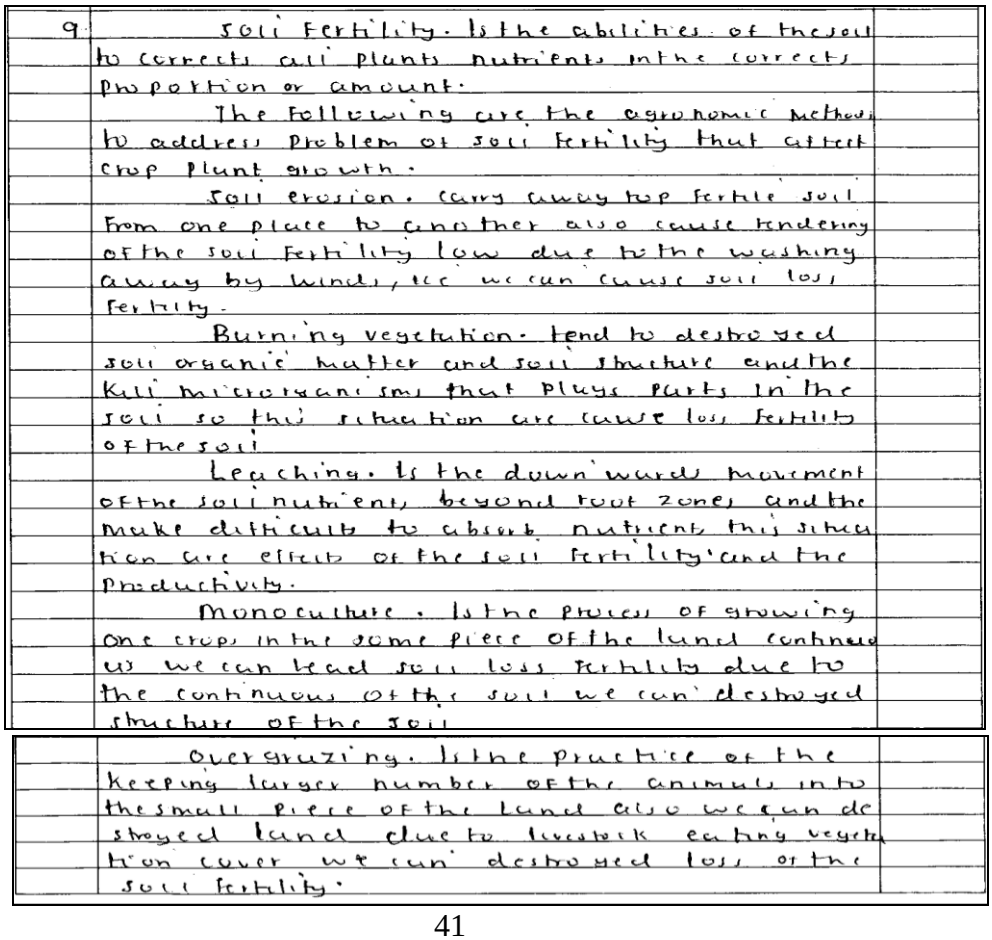
This can be concluded by declaring that the agronomic practices are more beneficials than the use of chemicals like artificial fertilizers since they may lead to negative harmfull effects on the plants like residue effects but the agronomic methods have no such effects though they are bulky and some times takes long time to practices.

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

Extract 7.1 indicates responses from a candidate who demonstrated good understanding of the methods of maintaining soil fertility.

Further analysis indicates 64.71 per cent of the candidates had average performance. Most of them organized well their essays and provided the correct methods of maintaining soil fertility. The exception is that they did not give full explanations of the methods implying possession of insufficient knowledge and skills of the subject matter.

On the other hand, 16.39 per cent of the candidates had a weak performance. The majority of them failed to account for the agronomic methods to address the problem of soil fertility that affects crop plant growth. Some provided ways in which the soil loses its fertility such as; *soil erosion*, *monoculture*, *weeding* and *leaching* instead of the methods of maintaining soil fertility. In this case, the candidates seemed to misunderstand the demand of the question. Others provided a variety of incorrect responses such as *the use of proper tools, sowing clean seeds, provision of education, establishment of good policy, establishment of guidance and counselling, use of genetic modified organisms, use of fungicide, burning of vegetative cover crops, availability of transport and communication and government support*. These incorrect responses justify that the candidates had poor knowledge and skills of the methods of maintaining soil fertility. Moreover, though the candidates tried to organise the essays did not understand what exactly to include in the introduction and conclusion parts. Extract 7.2 shows a sample of incorrect responses on the question.



9. Soil Fertility. Is the abilities of the soil to corrects all plants nutrients in the corrects proportion or amount.

The following are the agronomic methods to address problem of soil fertility that affect crop plant growth.

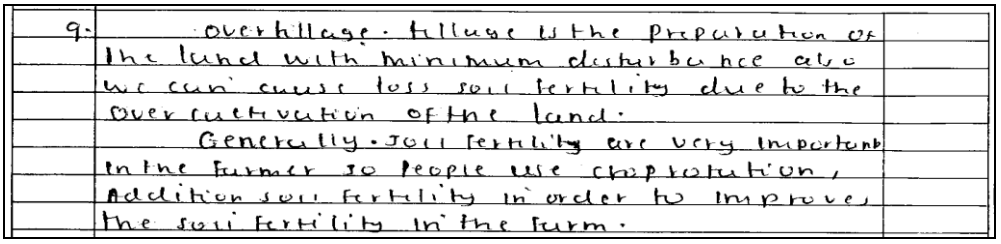
Soil erosion. Carry away top fertile soil from one place to another also cause hindering of the soil fertility low due to the washing away by winds, ice we can cause soil loss fertility.

Burning vegetation. Tend to destroyed soil organic matter and soil structure and the kill microorganisms that plays parts in the soil so this situation are cause loss fertility of the soil

Leaching. Is the down wards movement of the soil nutrients beyond root zones and the make difficult to absorb nutrient this situation are effects of the soil fertility and the productivity.

Monoculture. Is the process of growing one crops in the some piece of the land continued so we can heard soil loss fertility due to the continuous of the soil we can' destroyed structure of the soil

Overgruzing. Is the practice of the keeping larger number of the animals in to the small piece of the land also we can destroyed land due to livestock eating vegetation cover we can' destroyed loss of the soil fertility.


9. Overtillage: tillage is the preparation of the land with minimum disturbance also we can cause loss soil fertility due to the over cultivation of the land.
Generally soil fertility are very important in the farmer to people use crop rotation, Addition soil fertility in order to improves the soil fertility in the farm.

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

Extract 7.2 indicates responses from a candidate who attempted the question incorrectly. The candidate mostly provided ways in which soil loses its fertility instead of the methods of maintaining soil fertility.

2.1.10 Question 10: Introduction to Agriculture

The candidates were required to explain six points on how the knowledge of other subjects can be used in agriculture subject. The question examined the candidates' understanding of the relationship between agriculture and other subjects.

The question was opted by 3,704 (68.82%) candidates, among them 362 (7.70%) scored from 0.0 to 4.0 marks, 1,945 (41.34%) from 4.5 to 9.5 marks and 2,397 (50.96%) from 10 to 15 marks. Figure 10 portrays the distribution of candidates' scores on the question.

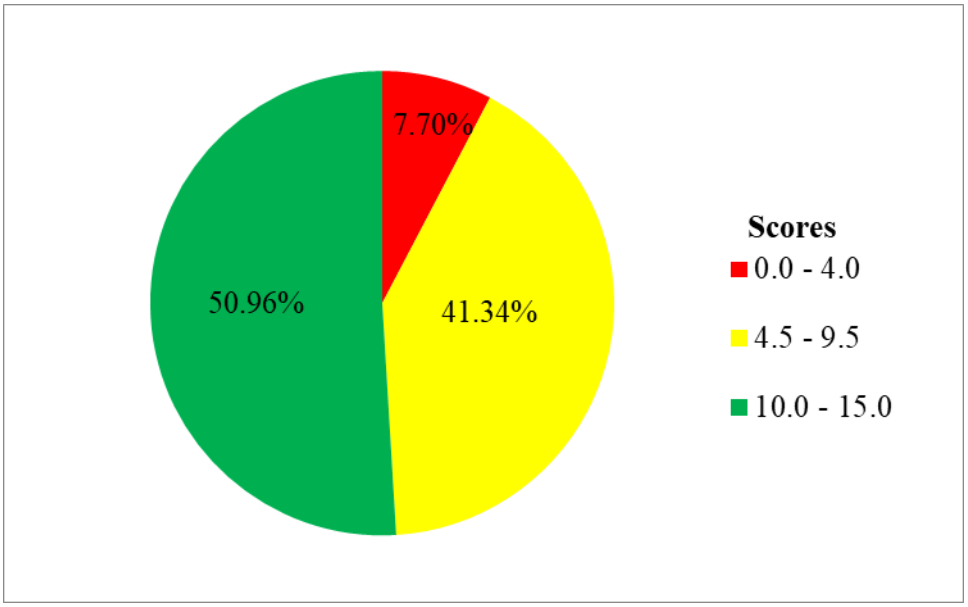


Figure 10: C*andidates' Performance on Question 10*

Figure 10 indicates that 92.30 per cent of the candidates scored from 4.5 to 15 marks and 7.70 per cent from 0.0 to 4.0 marks. Generally, the performance on the question was good.

The statistics show that 50.96 per cent of the candidates performed well on the question. Most of them correctly explained the relationship between agriculture and other subjects. They provided correct responses like; (i) *Agriculture and Physics; agricultural mechanisation involves the use of various tools, equipment and machines which operates following physics principles.* (ii) *Agriculture and Biology; the knowledge of biology helps farmers practice animal and plant breeding programs, control pests, parasites and diseases affecting plants and animals and monitor the growth of plants and animals for improved agricultural productivity*. (iii) *Agriculture and Mathematics; the mathematics knowledge and principles are applied in agriculture in various ways, for example when calculating plant populations, area of the land or farm size, fertilizer and seed rate. (iv)* Agriculture and chemistry*; chemistry in agriculture is used in various aspects.* For example; *in manufacturing and using various agro-chemicals such as herbicides, pesticides, fertilizer and drugs. Also through analysis and management of soil and its properties which help in the proper growth of crops and livestock.* (v) *Agriculture and Geography; agriculture relates to geography through the influence of climate and weather conditions. The understanding of climatic conditions is critical in the distribution of plants and animals thus helping farmers to plan for their farm activities and operations to obtain high yield.* (vi) *Agriculture and Business studies; the knowledge of business/economics helps the farmers to calculate profits or losses made during their farm operations and* (vii) *Agriculture and home Economics; agriculture relates to home economics in which it helps farmers to learn how to manage house hold resources including proper storage and best use of food which we produce in agriculture.* These correct responses signify that the candidates had a good understanding of how the knowledge of other subjects can be used in agriculture subject. Extract 8.1 depicts a sample of correct responses on the question.

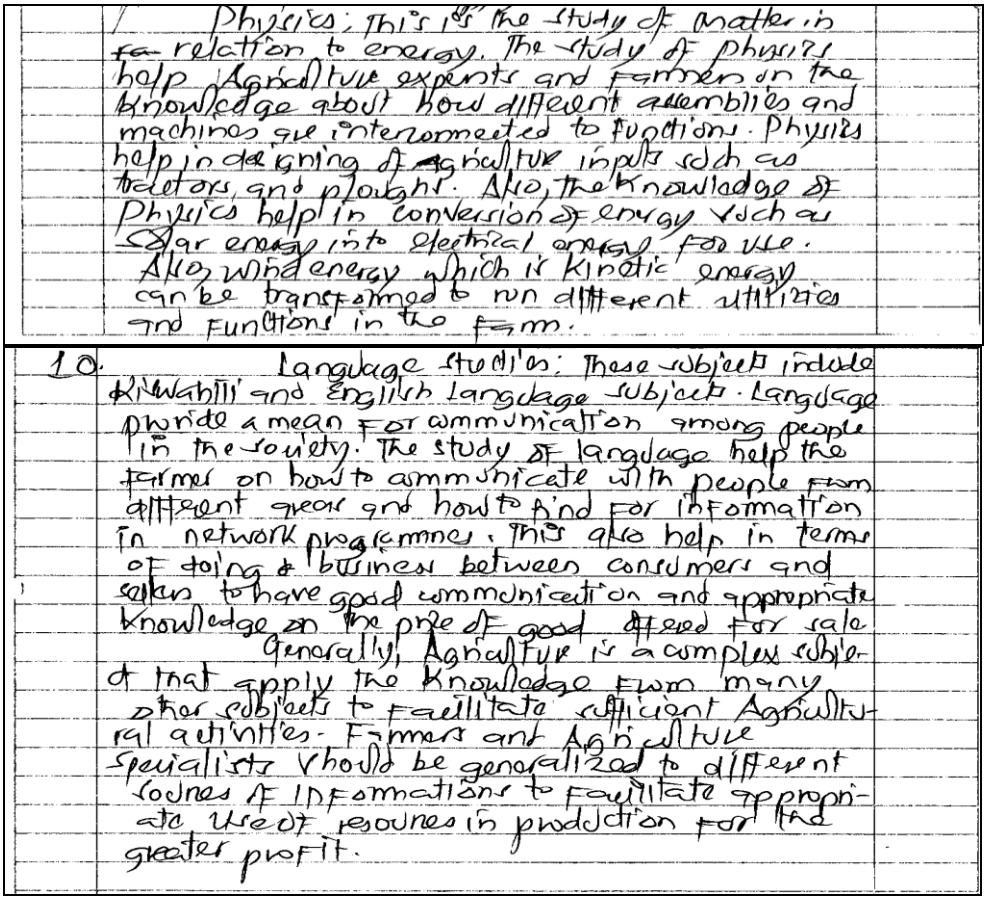
10. Agriculture is an art and science of rearing animals and cultivating crops. In Tanzania agriculture is regarded as sector and also a subject in school. Agriculture is one of the science subjects taught in Tanzania secondary schools. It has a lot of relationships with other subjects which assist it in its consentrisation. The following are some of the subjects that employ their knowledge on Agriculture so as to improve much the Agriculture subject.

Biology; This is the study of living things and life. It involve study of plants and animals. Through biology, the agriculture specialists tend to learn about how different animals adopt to different environment and also how pests attack and infect hosts. Such pests included ticks and worms. We get to know their habitat and how we can minimize them. Also, biology bring about knowledge of genetics that help in genetic engineering and production of Genetically Modified Organisms Etc (GMOs).

Chemistry; This is the study of composition, decomposition, structure and properties of matter. The knowledge of Chemistry play a great role in agriculture about the composition and ratings of pesticides, weed killer and fertilizer so as to be effective in the field. Chemistry bring about correct composition and proportion of plant nutrients such as Nitrogen (N), phosphorus and potassium (K). This help Agriculture specialists to base on correct chemicals to use in the field for effective result.

10. Economics; This is the study of trading and marketing channels. Agriculture and other sector depend on selling and buying of goods and services. The knowledge of economics help the Farmers and specialists to understand about the demands and supply of different products and how to sustain good price for required profit. The study of Book keeping also provide knowledge the farmer about ways of recording data and transactions and their importance in farming business.

Mathematics; This is the study of number involving counting, reading and calculating variables. The knowledge of Mathematics help the Agriculture specialists and Farmers to calculate for the profit and loss and also calculation about fertilizer recomendations in the field. For example, if the recommendation rate of Nitrogen is 36 kg/ha, and the fertilizer is rated 20% N, the mathematical calculations help to calculate how much fertilizer to apply to meet such needs.


Physics; This is the study of matter in relation to energy. The study of physics help Agriculture experts and farmers on the knowledge about how different assemblies and machines are interconnected to functions. Physics help in designing of agriculture inputs such as tractors, and ploughs. Also, the knowledge of Physics help in conversion of energy such as Solar energy into electrical energy for use. Also, wind energy which is kinetic energy can be transformed to run different utilities and functions in the farm.

10. Language studies; These subjects include Kiswahili and English language subjects. Language provide a mean for communication among people in the society. The study of language help the farmer on how to communicate with people from different areas and how to find for information in network programmes. This also help in terms of doing a business between consumers and sellers to have good communication and appropriate knowledge on the price of good afeed for sale

Generally, Agriculture is a complex subject that apply the knowledge from many other subjects to facilitate sufficient Agricultural activities. Farmers and Agriculture Specialists should be generalized to different sources of informations to facilitate appropriate use of resources in production for the greater profit.

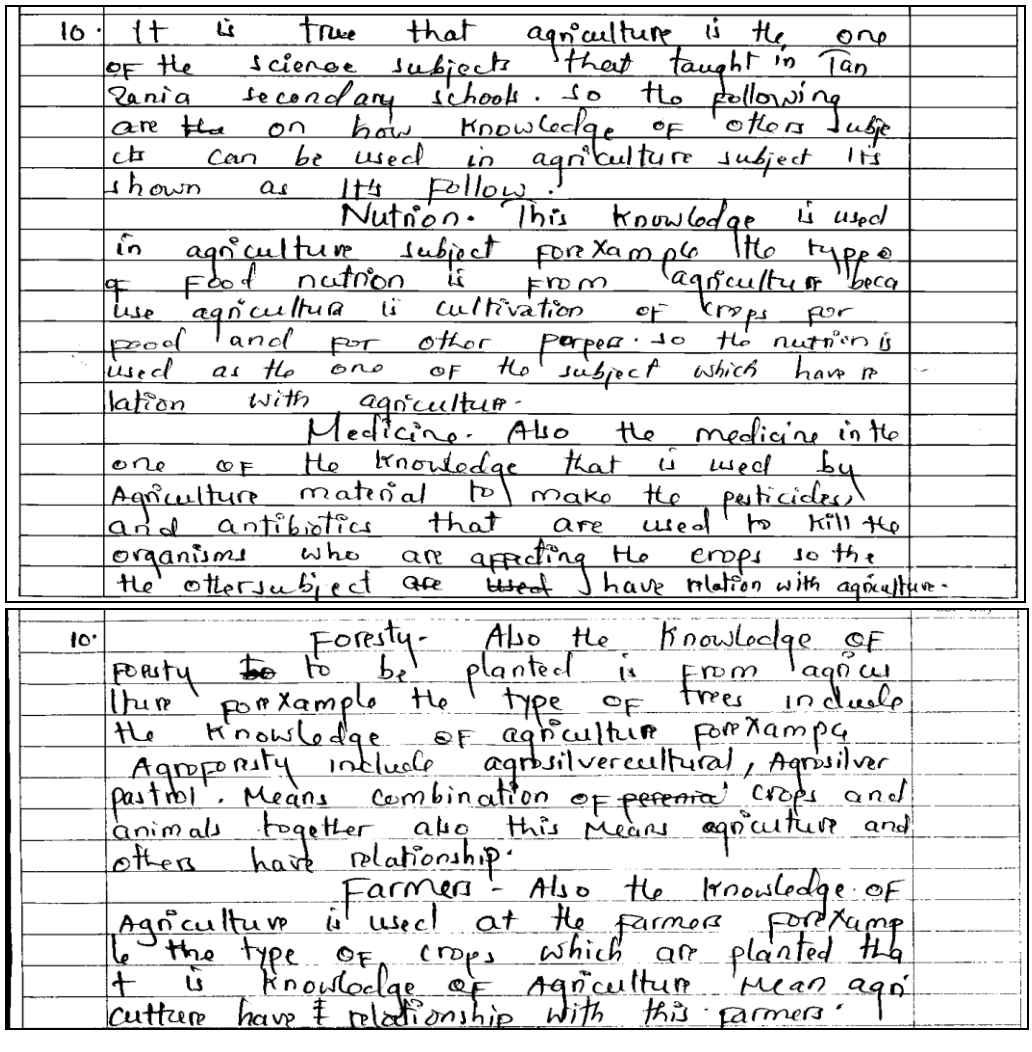
Extract 8.1: *A sample of the candidates' correct responses to Question 10.*

Extract 8.1 indicates responses from a candidate who demonstrated good understanding of the relationship between agriculture and other subjects.

Moreover, 41.34 per cent of the candidates had average performance. Most of them provided the correct subjects that relate to agriculture but failed to explain the relationship between agriculture and some of the subjects like home economics, geography and chemistry. Some of them failed to exhaust all the subjects that are related to agriculture. This signifies partial understanding of the relationship between agriculture and other subjects.

On the other side, 7.70 per cent of the candidates had a weak performance. The majority failed to explain the relationship between agriculture and other subjects. Some of them explained the importance of agriculture instead of the relationship between agriculture and other subject. Examples of incorrect responses provided were; *it helps to provide food, it helps in the provision of*

employment to people, it helps to improve the life standard, it helps to conserve our environment through forestry, helps to provide marketing of industrial goods and it helps to provide foreign exchange. Others provided factors of production such as; *land*, *labour*, *capital* and *entrepreneurship*. Furthermore, few candidates provided a variety of incorrect responses that were not related to the demand of the question such as; *used in farming activities, soil analysis, used in agroforestry, used in agricultural mechanization, used in veterinary services and used in industries, it helps to identify the type of soil during crop production, it helps to get good products and crop yields, it helps to search new knowledge and it helps to control soil erosion.* These incorrect responses indicate that the candidates lacked knowledge of the relationship between agriculture and other subjects. Extract 8.2 is a sample of the candidates' incorrect responses on the question.



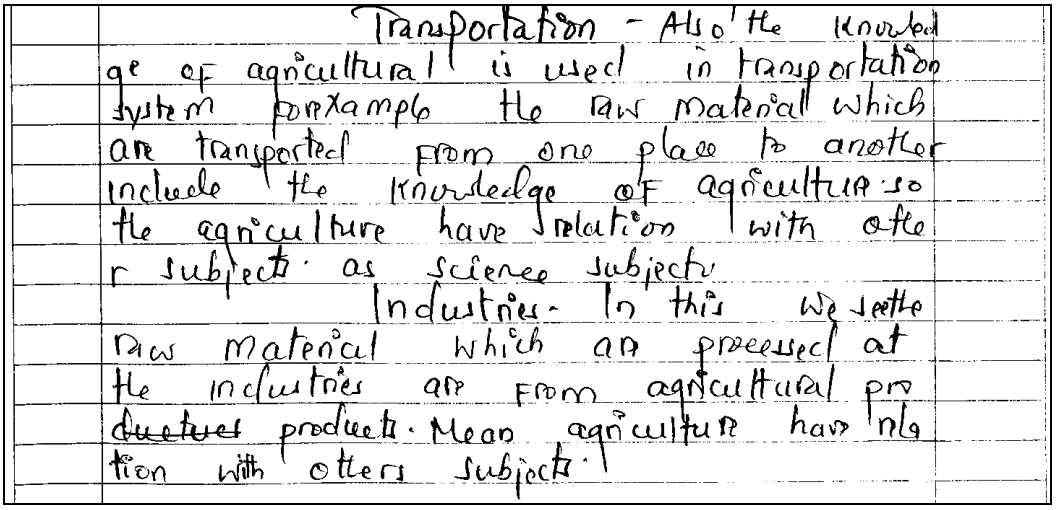
10. It is true that agriculture is the one of the science subjects that taught in Tan Zania secondary schools. So the following are the on how knowledge of others subjects can be used in agriculture subject It's shown as It's follow.

Nutrion. This knowledge is used in agriculture subject Forxample the type of Food nutrion is from agriculture because agriculture is cultivation of crops for food and for other purpose. so the nutrion is used as the one of the subject which have relation with agriculture.

Medicine. Also the medicine in the one of the knowledge that is used by Agriculture material to make the pesticides and antibiotics that are used to kill the organisms who are affecting the crops so the the othersubject are ~~used~~ have relation with agriculture.

10. Forestry. Also the knowledge of forsty ~~to~~ to be planted is from agriculture Forxample the type of trees include the knowledge of agriculture Forxamp Agroforsty include agrosilvercultural, Agrosilver pastrol. Means combination of perennial crops and animals together also this means agriculture and others have relationship.

Farmers - Also the knowledge of Agriculture is used at the farmers Forxample the type of crops which are planted that is knowledge of Agriculture mean agriculture have ₹ relationship with this farmers.


Transportation - Also the knowled
ge of agricultural is used in transportation
system forexample the raw material which
are transported from one place to another
include the knowledge of agriculture so
the agriculture have relation with othe
r subjects as science subjects
Industries. In this we settle
raw material which are processed at
the industries are from agricultural pro
ductues products. Mean agriculture have rela
tion with otters subjects.

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

Extract 8.2 exemplifies the responses from a candidate who failed to identify the subjects that are related to agriculture and how they relate. This shows lack of subject matter knowledge.

2.1.11 Question 11: Factors of Production

The candidates were required to account for the factors of production and give two roles played by each of the factor. The question assessed candidates' knowledge of the factors of production.

The question was attempted by 2,795 (40.89%) candidates of which 607 (21.72) scored from 0.0 to 4.0 marks, 1,606 (57.46%) from 4.5 to 9.5 marks and 582 (20.82) from 10 to 15 marks. Figure 11 indicates the distribution of candidates' scores on the question.

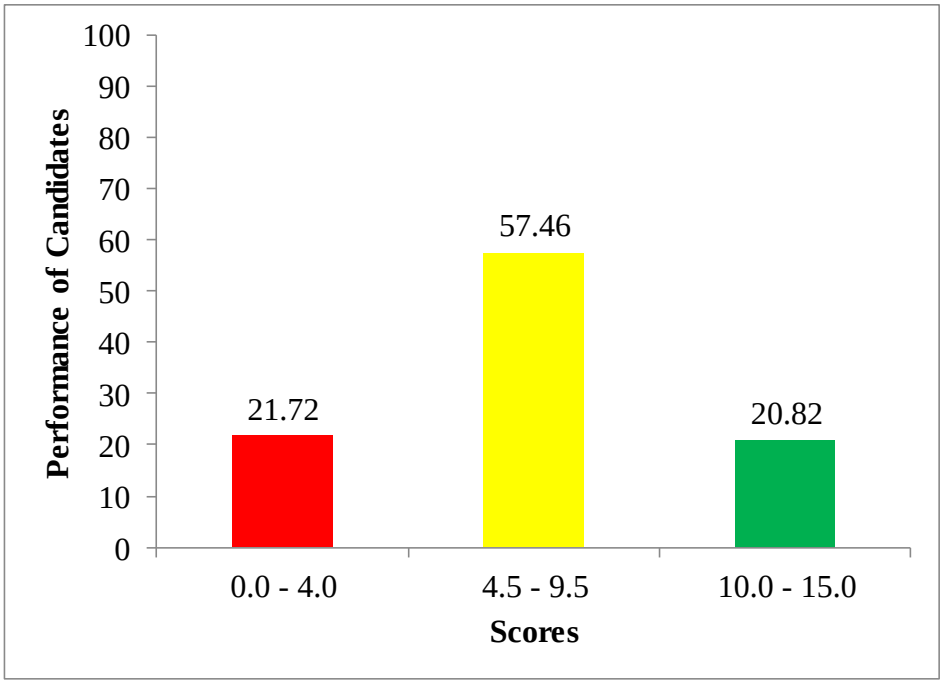


Figure 11: C*andidates' Performance on Question 11*

According to figure 11, 78.28 per cent of the candidates scored from 4.5 to 15 marks whereas 21.72 per cent from 0.0 to 4.0 marks. The general performance on the question was good.

The data show 20.82 per cent of the candidates performed well. The majority of them were able to account for the factors of production and give their roles. The correct responses were; (i) *Land*; *a non-man made factor that includes all natural resources which are found in a particular place. The roles of land include; land is a site of all production processes. All farm activities are carried on the land that ultimately provides raw materials for other sectors. The natural resources found on the land such as minerals are important raw materials for manufacturing industrial goods; sources of farm power such as electricity, diesel, coal and oil are extracted from the land.* (ii) *Labour; refers to all human efforts or resources which are used in the production processes and or in the provision of services. As a factor of production, labour does not include any work done for leisure or which does not carry any monetary reward. The roles of labour include; control of other factors of production, provision of skills needed for production and operation of machines.* (iii) *Capital; includes all man-made*

assets which are used together with land, labour and entrepreneurship in creation of goods and provision of services. The following are the roles of capital; it assists other factors of production, helps in the acquisition of other factors of production, and saves time and labour. (iv) *Entrepreneurship; is referred as management or organization of the production process. The roles of entrepreneurship include; combining other factors of production, risk-taking, decision-making, keeping records and searching for skills and knowledge relevant to the farming enterprise.* These correct responses signify candidates understanding of factors of production. Extract 9.1 shows a sample of correct responses from one of the candidates.

11	the production of the intended yield, land is also where agro-based industries are built for processing the agricultural raw materials and turning them into consumable form, thus , for a successful production process land should also be taken into consideration for the intended achievements.
	Labour, labour refers to the individuals either skilled or unskilled who perform various field operations on the farm, in production process labourers are also very important as they a great role in making the production successful, labours carry out various field operations such as planting, weeding and harvesting, the skilled labours are important in provision of veterinery services such as treatment of livestock and best methods of production, on other hand labours are also source of power on the farm

Labours are usually the source of human power on the farm by performing various farm activities for the production of valuable agricultural goods and services, thus for successful production process labours are very essential to be considered.

Enterpreneurship, enterpreneurship or management refers to the process of allocating the available resources in order the desired goals, enterpreneurship perform great roles in agricultural production, its roles include searching for new knowledge and skills relevant to the farming enterprise, this in turn leads to the better performance of the invested enterprise, on other side enterpreneurship also plays a great role is innovating or developing new processes to product valuable goods or services.

Generally, the factors of production are very important for the successful production process, hence in order to increase agricultural productivity the farmers should have sufficient knowledge on these factors of production and they should

11 Factors of production refers to the resources that can be utilized by the farmer in order to make the production process successful. For any production process to take place successfully and expectedly the factors of production are the key factors that should be firstly considered. The following are the factors of production and the roles they play to increase agricultural ~~activity~~ productivity;

Capital, capital is any asset or property or money owned by a farmer in order to start the production process. For any production process capital plays a great role in making it successful, it enables a farmer to attain important farm requirement for instance inputs such as fertilizers, manure, seeds, pesticides and insecticides, capital is also used by a farmer to make successful various field operations such as land preparation, planting, weeding and harvesting as it acts as a means of payment, therefore in order to increase agricultural productivity capital is an important factor in order to achieve the goals of the farmer.

Land, land is a part of the earth surface on which the production processes are carried out, land as one of the factors of production it plays important roles in making the production process successful, land consists soil which is an important component for carrying out production process, all agricultural crops that are grown depend on the fertile soil for

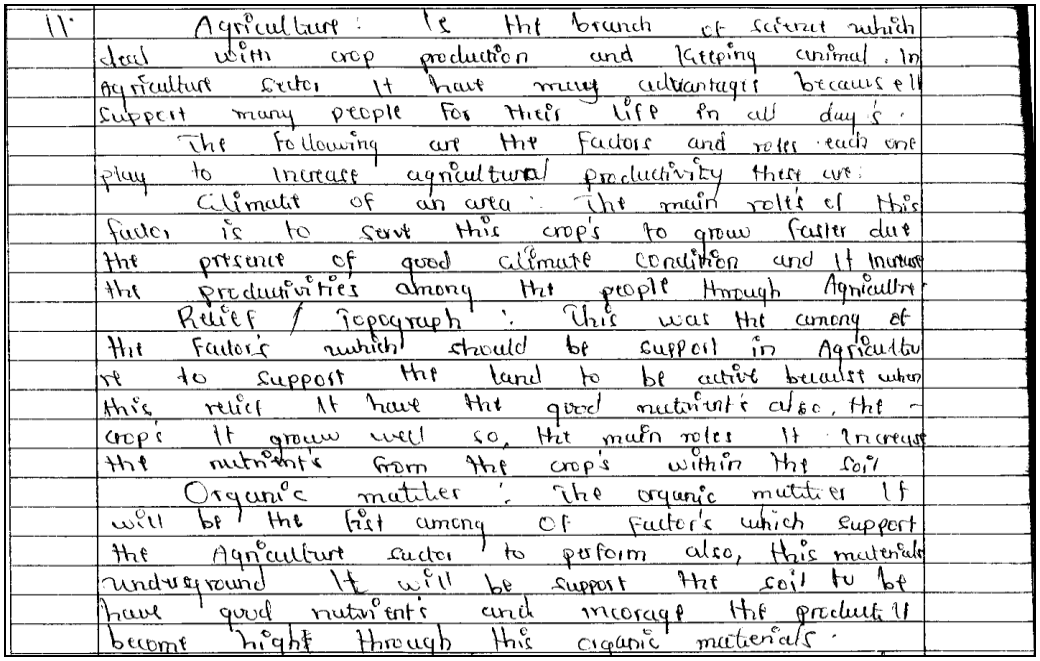
11 should ensure that these factors are firstly fulfilled before the production process, this help to make agricultural sector a profitable sector to the economic development in Tanzania.

Extract 9:1: *A sample of the candidates' correct responses to Question 11.*

Extract 9.1 represents responses from a candidate who correctly accounted for the factors of production.

Furthermore, statistics indicate that 57.46 per cent of the candidates performed averagely on the question. Most of them managed to account for the factors of production but were unable to give their roles. This implies possession of inadequate knowledge of the factors of production.

On the contrary, 21.72 per cent of the candidates had a weak performance. The majority of them failed to account for the factors of production and the roles played by each factor. They provided a variety of incorrect responses that focused on services which facilitate agricultural production such as; *availability of good transport and communication, improvement of the skills and knowledge, enhancement of capital to the farmers, provision of social services like; water, health and education, provision of government support, production principles should be followed by the farmers, provision of seminars, enough distribution of raw materials like manure and seeds, provision of enough and suitable market for the farmers and through employing skilled labours.* The provision of incorrect responses is attributed to lack of understanding of the factors of production. Extract 9.2 indicates responses from a candidate who had a weak performance on the question.



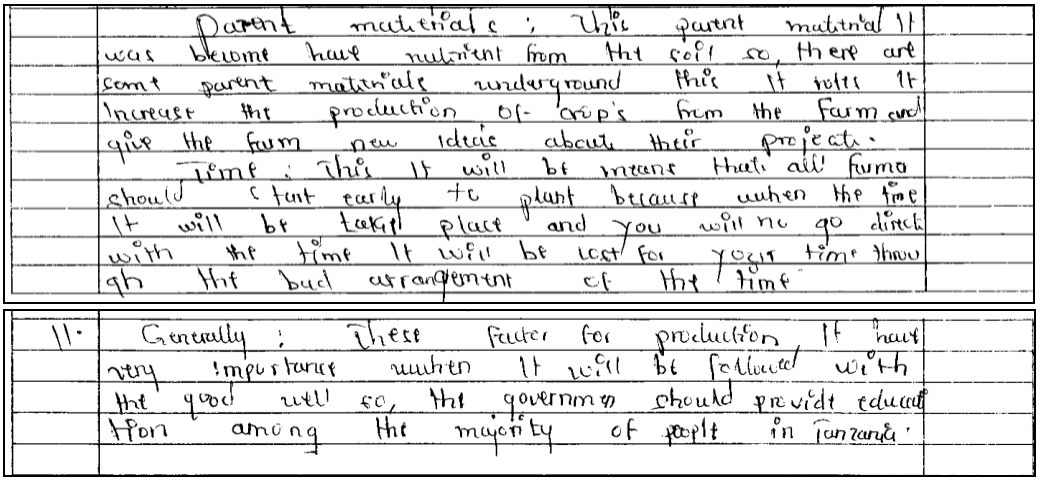
11. Agriculture : Is the branch of science which deal with crop production and keeping animal . In Agriculture Sector it have many advantages because it Support many people For their life in all day's .

The following are the Factors and roles each one play to increase agricultural productivity there are:

Climate of an area : The main role's of this factor is to save this crop's to grow faster due the presence of good climate condition and it increase the productivities among the people through Agriculture .

Relief / Topograph : This was the among of the Factor's which should be support in Agriculture it to support the land to be active because when this relief it have the good nutrient's also, the crop's it grow well so, the main roles it increase the nutrient's from the crop's within the soil

Organic matter : The organic matter it will be the list among of Factor's which support the Agriculture Sector to perform also, this materials underground it will be support the soil to be have good nutrient's and increase the product it become bright through this organic material's .


Parent material : This parent material it was become have nutrient from the soil so, there are some parent materials underground this it helps it increase the production of crop's from the farm and give the farm new ideas about their projects.
Time : This it will be means that all farmer should start early to plant because when the time it will be take place and you will no go direct with the time it will be lost for your time throw gh the bad arrangement of the time

11. Generally : These factor for production it have very importance when it will be followed with the good will so, the government should provide education upon among the mayority of people in Tanzania.

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

Extract 9.2 shows responses from a candidate who attempted the question incorrectly. The candidate provided the factors of soil formation instead of the factors of production.

2.2 034/2 AGRICULTURE 2

2.2.1 Question 1: Livestock Production

In this question, the candidates were provided with the following specimens and materials: Parts of the goat digestive system labelled **W** (Reticulum), **X** (Abomasum), **Y** (Rumen) and **Z** (Omasum), hand groves, hand lens and scalpel. They were instructed to perform the following procedures and then answer the questions that follow:

Procedures

(i) Wear the hand gloves.

(ii) With the aid of a hand lens and scalpel, carefully observe the inner linings of the labelled parts.

Questions

(a) Giving the characteristic feature, identify each of the parts **W**, **Y** and **Z**.

(b) (i) Why is part **W** known as a hardware stomach?

(ii) Apart from its role in part (b) (i), what is the function of part **W**?

(iii) Give the adaptation of part **W** to its function in part (b) (ii).

(c) Why is part **X** considered a true stomach? Give a reason.

(d) Examine three functions and three adaptations of part **Y** to its functions.

(e) What are the three functions of part **Z**?

(f) Briefly explain the process of rumination in animals with digestive system containing parts **W**, **X**, **Y** and **Z**.

(g) (i) Briefly describe the common health problem associated with each of parts **W** and **Y**.

(ii) How can the health problem in part (g) (i) be prevented?

The question tested the candidates' knowledge and practical skills of the anatomy and physiology of the ruminant digestive system.

The question was attempted by all 6,835 (100%) candidates, whereby 2,891 (42.30%) scored from 0.0 to 7.0 marks, 3,357 (53.65%) from 7.5 to 16 marks and 277 (4.05%) from 16.5 to 25 marks. Figure 12 illustrates the distribution of candidates' scores on the question.

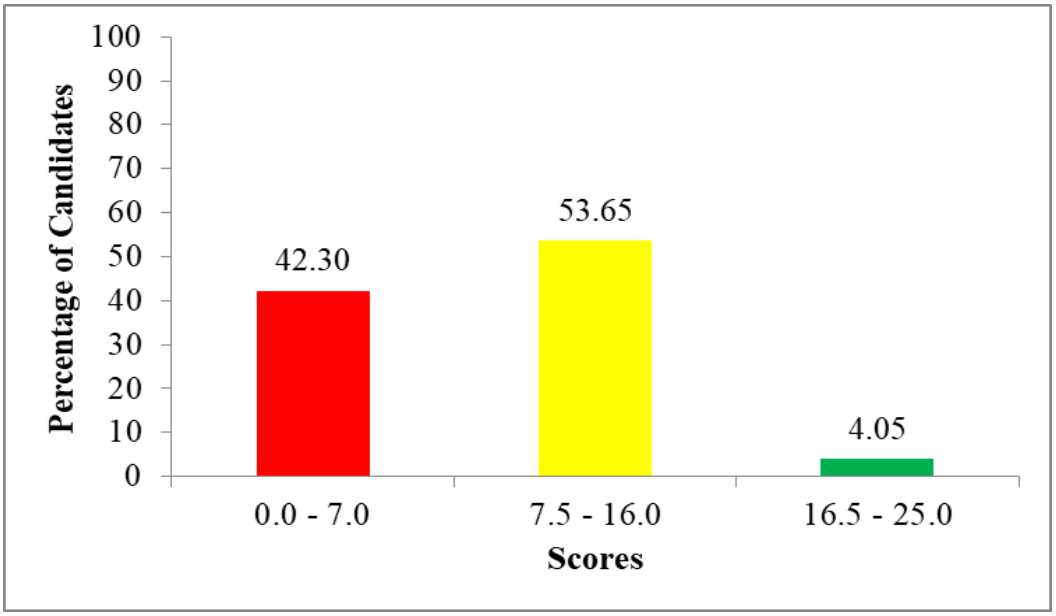


Figure 12: C*andidates' Performance on Question 1 Paper 2*

As shown in Figure 12, 57.70 per cent of the candidates scored from 7.5 to 25 marks while 42.30 per cent from 0.0 to 7.0 marks. The candidates' performance on the question was generally average.

The candidates who had good performance on the question were 4.05 per cent. The majority of them correctly identified the labelled parts of the ruminant digestive system, the fact that facilitated the provision of correct responses in almost all parts of the question.

In part (a), the candidates managed to identify parts labelled **W**, **Y** and **Z** by giving their characteristic features. The correct responses were; **W**-Reticulum*; which is honeycomb-like*, **Y**- Rumen*; which is towel-like and* **Z**- Omasum*; which is book-like.*

In part (b) (i), the candidates correctly gave a reason for part **W** to be known as hardware stomach. The correct response was; *it traps and collects heavy objects the animal consumes*.

In part (b) (ii), they provided correct function of part **W** as follows; *it collects small digesta particles and passes them into the omasum and it returns to the rumen large food particles*.

In part (b) (iii), the candidates managed to give the correct adaptation of part **W** to its function such as; *having small tissues fold that separate it from the rumen to allow passage of small digesta and large food particles to be regurgitated*.

In part (c), the candidates managed to give reason a for part **X** to be considered as a true stomach. The correct response provided was; *it has glands that secrete hydrochloric acid and digestive enzymes responsible for chemical digestion.*

Moreover, in part (d) the candidates correctly examined the functions and adaptations of part **Y**. They provided correct functions like; acts *as a storage of feed, it is a fermentation vat where microbes digest feed to make volatile fatty acids (VFAs), absorb VFAs and other digestion products and synthesizes amino acids and vitamin B complexes*. On the other hand, they provided correct adaptations such as; *it is large to enable storage of large quantities of feed, has tiny projections that increase surface area for absorption and it has a pH of 6.7 that fever activities of microbes.*

In part (e), the candidates gave correct functions of part **Z** (omasum) as; *it aids the transportation of small-sized feed particles from the reticulum to the abomasum for enzymatic digestion, fermentation of ingesta and absorption of water, volatile fatty acids and minerals*.

In part (f), the candidates correctly explained the process of rumination in animals with the digestive system containing parts **W**, **X**, **Y** and **Z**. The correct response provided was; *rumination is the process in ruminants where during rest period the undigested food in the rumen rises back up to the oesophagus and into the mouth to be re-chewed and broken down into small pieces. The food is re-salivated and re-swallowed. This process makes it easier for microbes to digest*.

In part (g) (i), the candidates correctly described the common health problems associated with parts **W** and **Y**. The correct responses provided were*;* **W** (reticulum); *hardware disease which occurs when an animal ingest heavy or sharp objects like nails, screws or wire which are swept into the reticulum and may puncture the stomach wall*. **Y** (rumen); *bloat which occurs when the animal cannot eradicate a buildup of gas, acidosis and rumenitis as a result of low pH balance that causes high acid production.* Likewise, in part (g) (ii) the candidates managed to give ways to prevent health problems in part (g) (i). The correct responses provided were; *hardware disease can be prevented by putting a magnet in feeding equipment to catch any metal* and *bloat can be prevented by managing and paying attention to animal feed and water intake.* The correct responses provided signify possession of adequate knowledge and field practical skills of ruminant digestive system. Extract 10.1 is a sample of candidates' correct responses on the question.

1.(a)	• Specimen W : RETICULUM • Characteristic feature : Looks like a honey comb • Specimen Y : RUMEN • Characteristic feature : Looks like a towel • Specimen Z : OMASUM • Characteristic feature : Has an intestine like structure.	
1.(b)	i. – Because part W is the only stomach that can store sharp objects example nails and pieces of wire while other stomach can not store these materials but only part W (Reticulum) can store them hence a hardware stomach.	
1.(b)	ii. • Function of part W (Reticulum) > Separates large food particles to be reguraitated.	

1.(b) iii. • Adaptation of part W (Reticulum) to its function in part (b)(i)
> Reticulum has thick walls which help in separating large food particles to be regurgitated.

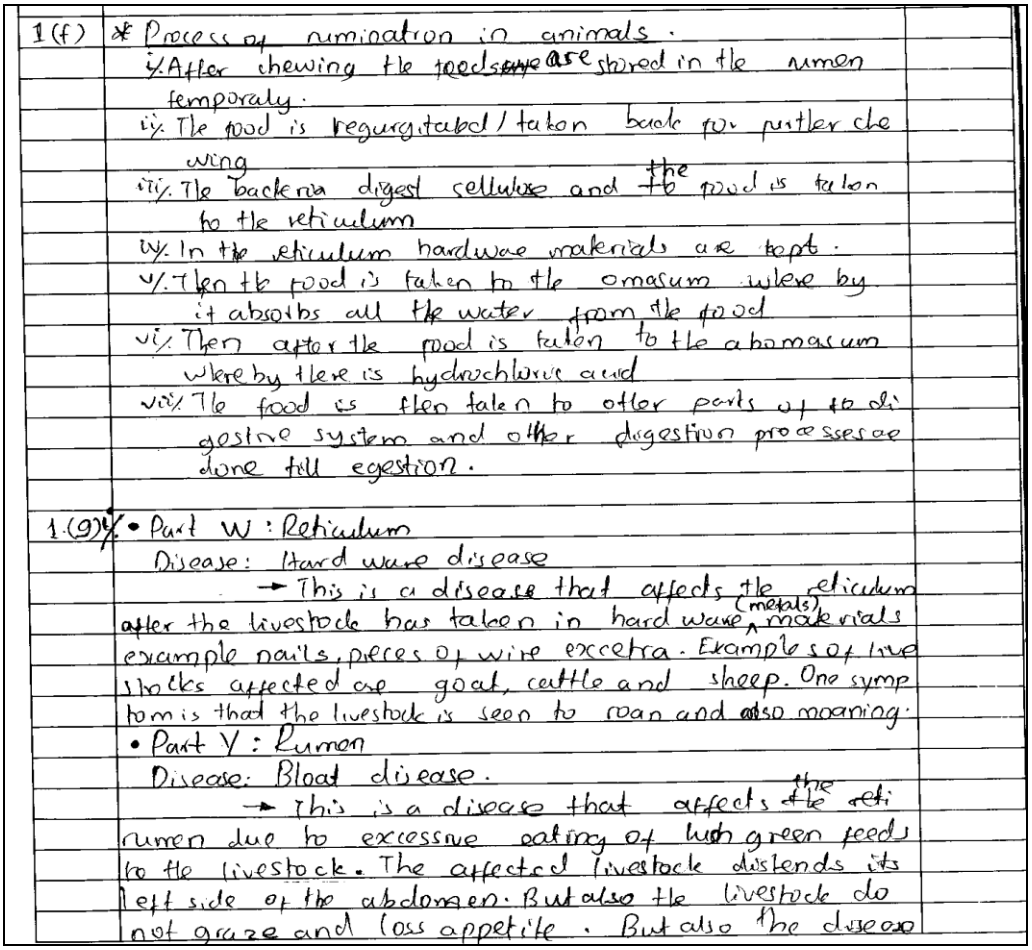
1.(c) • Why part X (Abomasum) considered to be a true stomach
- Because it is similar to monogastric's stomach.
- Because it has pepsin enzymes.
- Because it has renin enzymes.
- Because it has hydrochloric acid.

1.(d) • Functions of part Y (RUMEN)
i. Digests cellulose ~~by use of bacteria and protozoa~~ to fatty acids.
ii. Stores food temporaly
iii. To synthesize the nutrients to be vitamin B-complex.

• Adaptations of part Y (RUMEN) to its functions

FEATURE	FUNCTION
i. Contains micro-organisms	→ To digest cellulose to fatty acids
ii. Contains micro-organisms	→ To synthesize the nutrients to be vitamin B-complex
iii. It is very wide/It is very large	→ To store food temporaly.

1.(e) • Functions of part Z (OMASUM)
i. Absorbs water from the food.
ii. Strains the food.
iii. Allows food into the abomasum.



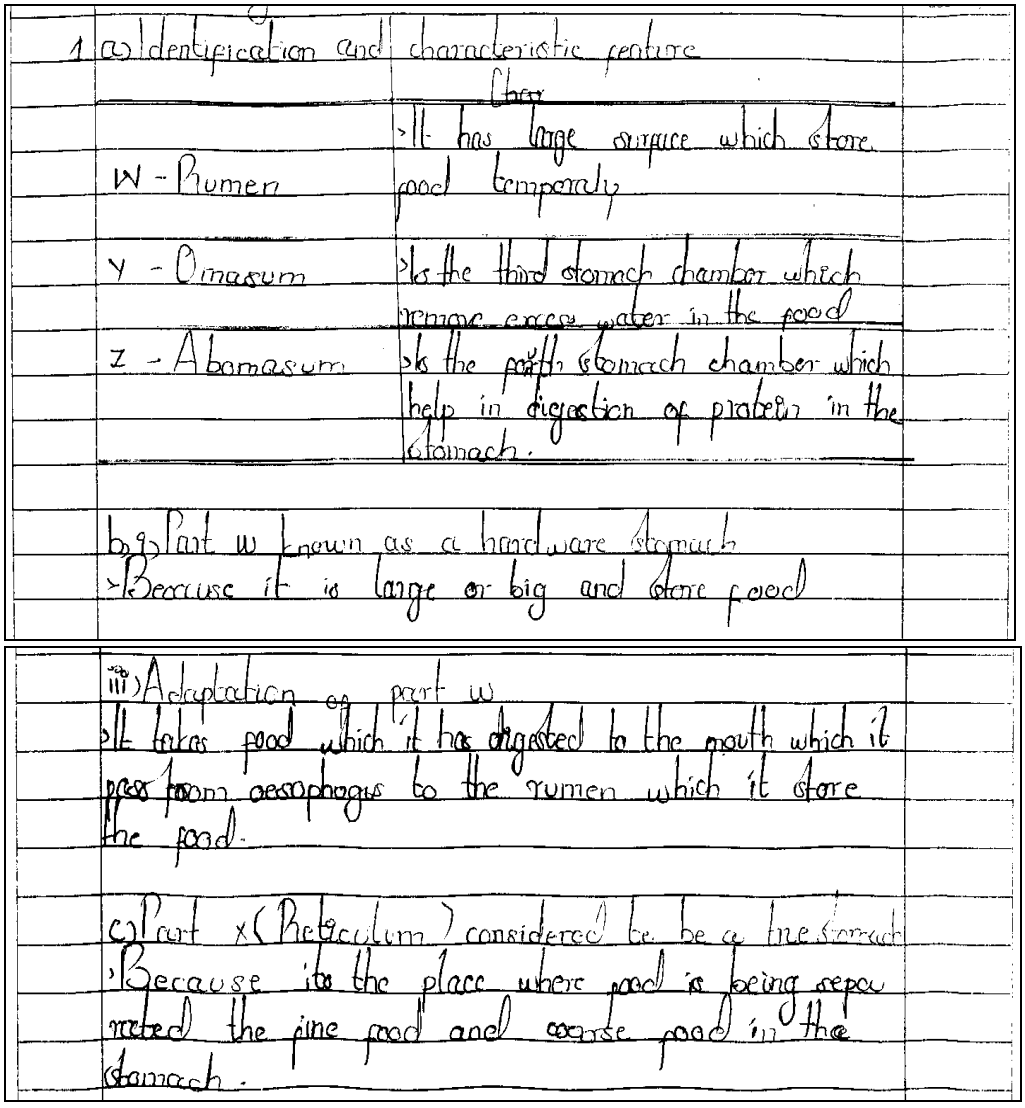
Extract 10.1: *A sample of the candidates' correct responses to Question 1.*

Extract 10.1 presents responses from a candidate who attempted well the question. He/she demonstrated good understanding of the ruminant digestive system.

Furthermore, the candidates who performed averagely were 53.65 per cent. The majority of them managed to identify the labelled parts of the ruminant digestive system. However, they failed to provide correct responses in some parts of the question for example, in part (e) the candidates provided the function of abomasum instead of omasum. Moreover, in part (f) they described the process of digestion in the mouth instead of rumination. This implies they had insufficient knowledge of the ruminant digestive system.

On the contrary, 42.30 per cent of the candidates had weak performance. Most of them were unable to identify the labelled parts of the ruminant digestive

system and consequently responded incorrectly in almost all parts of the question. The candidates matched the sequence of the letters used in labelling the parts with the sequence of arrangement of stomach chambers. Thus, incorrectly identified the parts as follows: **W** (rumen), **X** (reticulum), **Y** (omasum), and **Z** (abomasum). Hence, the incorrect responses provided in parts of the question were related to the identified parts. This signifies lack of knowledge and skills of the ruminant digestive system. Extract 10.2 exemplifies a sample of incorrect responses on the question.



1 a) Identification and characteristic feature

	Char
W - Rumen	> It has large surface which store food temporarily
Y - Omasum	> Is the third stomach chamber which remove excess water in the food
Z - Abomasum	> Is the forth stomach chamber which help in digestion of protein in the stomach.

b) Part W known as a hardware stomach
> Because it is large or big and store food

iii) Adaptation of part W
> It takes food which it has digested to the mouth which it pass from oesophagus to the rumen which it store the food.

c) Part X (Reticulum) considered to be a true stomach
> Because it is the place where food is being separated the fine food and coarse food in the stomach.

1d

3 Function of part Y (Omasum)

> To remove excess water in the food

> It dries food in the stomach.

> It help in taking off water to the food.

Adaptation of part Y (Omasum)

> Its a chamber which remove excess water in food

> It takes food from reticulum to the small intestine

> It digest food.

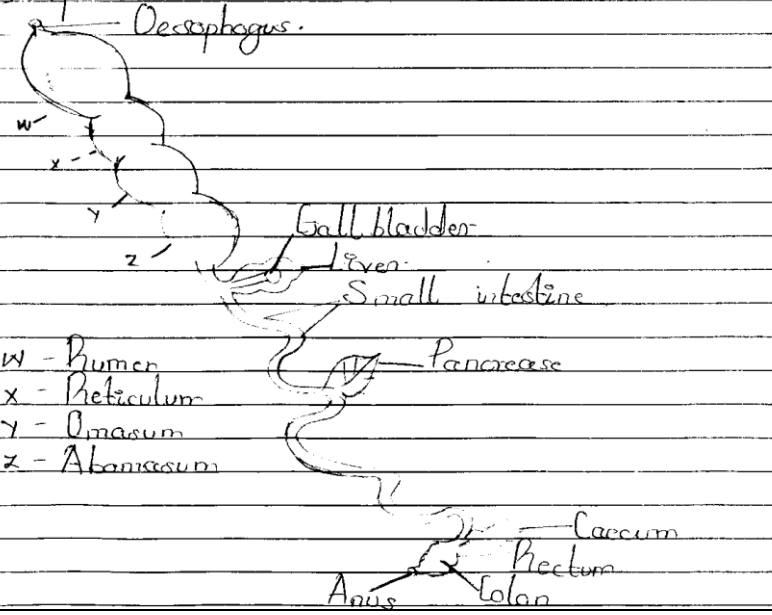
e) Function of part Z (Abomasum)

> Protein digestion begins there

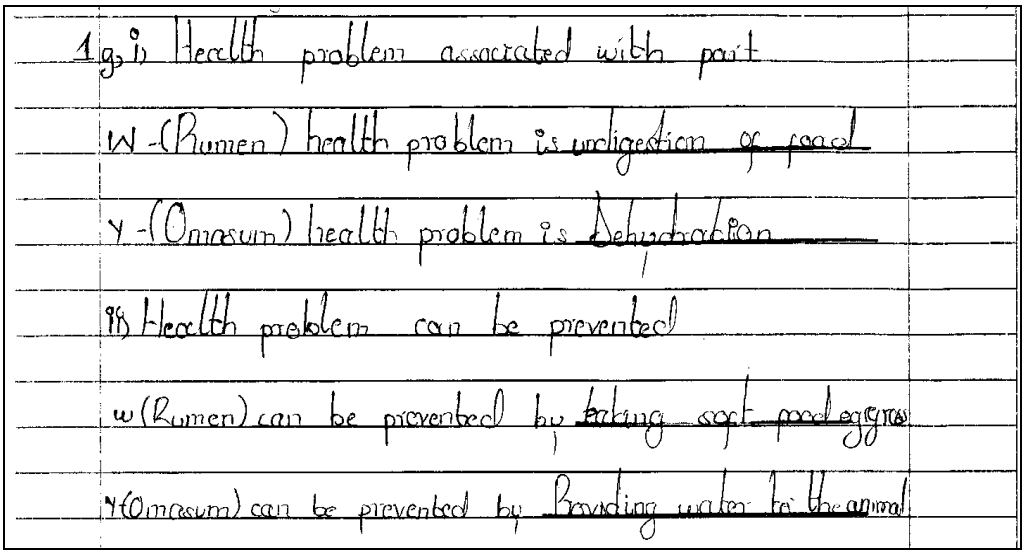
> Formation of end product amino acid formed

> It help in provision of energy to the animal.

1 a) b) i) ii)



W - Rumen
X - Reticulum
Y - Omasum
Z - Abomasum



Extract 10.2: *A sample of the candidate's incorrect responses to Question 1.*

Extract 10.2 shows responses from a candidate who incorrectly identified the labelled parts hence provided incorrect responses in all parts of the question.

2.2.2 Question 2: Soil Science and Crop Production.

(a) The question constituted parts (a) and (b). In part (a), the candidates were provided with the following specimens and materials: dry sand soil, measuring cylinder, beaker and water. They were required to design and carry out an experiment to verify that soil contains air and write a report for the experiment. The question tested the candidates' ability to analyse the soil constituents. In part (b), the candidates were provided with the following specimens and materials: **P** (okra plant infected with powdery mildew), **Q** (okra plant infected with dumping off) and hand lens. They were required to use hand lens to make careful observations of the specimens and answer the questions that follow:

Questions

(i) Point out the characteristic symptoms and the diseases affecting each of the following specimens **P** and **Q**.

(ii) What is the causative agent of the disease affecting specimen **P** and **Q**.

(iii) Suggest three preventive measures for the disease affecting specimen **P** and four for the disease affecting specimen **Q**.

The question tested the candidates' knowledge and practical skills of crop plant diseases.

The question was attempted by all 6,835 (100%) candidates out of which 2,221 (32.49%) scored from 0.0 to 7.0 marks, 3,931 (57.52%) from 7.5 to 16 marks and 683 (9.99%) from 16.5 to 25 marks. Figure 13 depicts the distribution of the candidates' scores on the question.

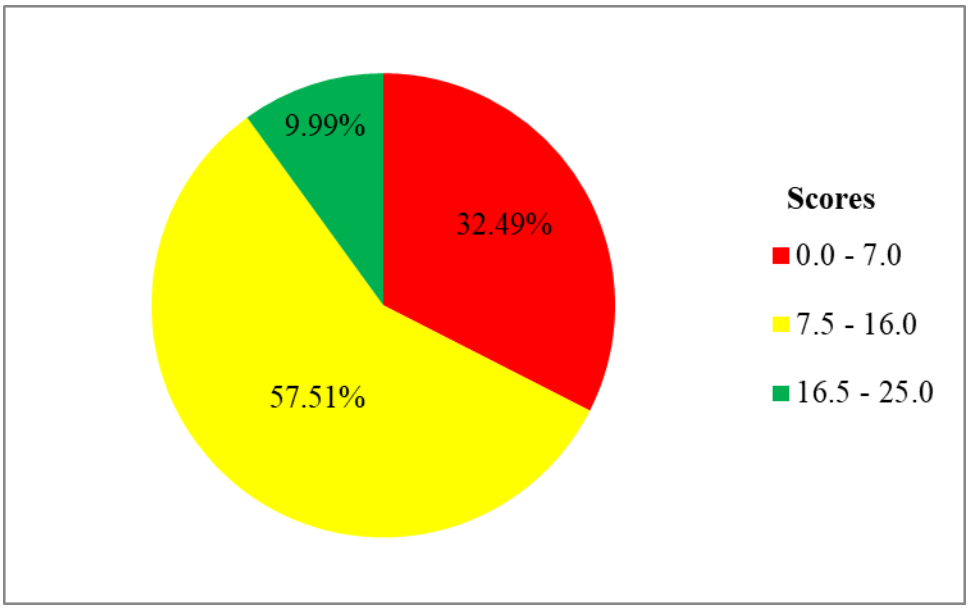


Figure 13: C*andidates' Performance on Question 2 Paper 2*

Figure 13 indicates that 67.51 per cent of the candidates scored from 7.5 to 25 marks whereas 32.49 per cent from 0.0 to 7.0 marks. The general performance on the question was good.

Data show 9.99 per cent of the candidates performed well on the question. The majority of them attempted correctly in nearly all parts of the question. In part (a), they were able to design and carry out an experiment to verify that soil contains air. This was justified by a good presentation of the experimental report as follows:

AIM: *to verify that soil contains air*.

SPECIMEN APPARATUS AND MATERIALS: *soil sample, measuring cylinder, water and beaker*.

PROCEDURES:

(a) *100 cm^3 of the soil sample was put into 100 cm^3 beaker*.

(b) *200 cm^3 of water was poured into a 500 cm^3 measuring cylinder.*

(c) *100 cm^3 of soil sample was put into the measuring cylinder containing water*.

(d) *The hand was placed into the mouth of the measuring cylinder, the mixture was shaken thoroughly, and*

(e) *The mixture was left to settle while making observations.*

OBSERVATIONS AND RESULTS: *air bubbles were seen escaping from the mixture. The bubble represents air that moves out of the pore space. Water replaces air in the pore spaces.*

CONCLUSION: *soil contains air*.

This indicates possession of adequate knowledge and laboratory practical skills in verifying that soil contains air.

Moreover, in part (b) (i) they correctly pointed out the characteristics symptoms and the disease affecting each of the specimens **P** and **Q**. The responses were; *powdery white covering on leaves for powdery mildew in specimen **P*** and *water soaked rotting of the stem and roting tissue for dumping off in specimen **Q***.

In part (b) (ii), they correctly named the causative agent of the diseases affecting specimens **P** and **Q** as fungi. In part (b) (iii), they managed to suggest preventive measures for the diseases affecting specimens **P** and **Q**. The correct responses provided were; specimen **P** (a) *use of overhead irrigation that washes fungus from leaves and reduces viability (b) early planting which enables plants to escape fungal diseases that are mostly soil-borne (iii) application of appropriate fungicides. For specimen **Q*** (a) *provide good air circulation* (b) *use of fungicide (c) sow seeds to prevent overcrowding which can lead to humid, moist condition* (d) *never water past noon so that the soil surface and plants are dry by evening and avoid overwatering tender seedlings*. Such correct responses from the candidates show possession of adequate knowledge and field practical skills of the named diseases. Extract 11.1 presents a sample of the correct responses on the question.

2.a) i) Specimen Q

d) The plant can fail to emerge on the soil during germination.

e) Some specimens can not have roots also roots can turn into gray-brown colour.

ii) Causative agents of

Specimen P are fungus

Those fungus can be Erysiphe cynchoracearum

Specimen Q are also fungus

Those fungus are Rhizoctonia spp, Fusarium spp and Pythium spp.

iii) Preventive measures of

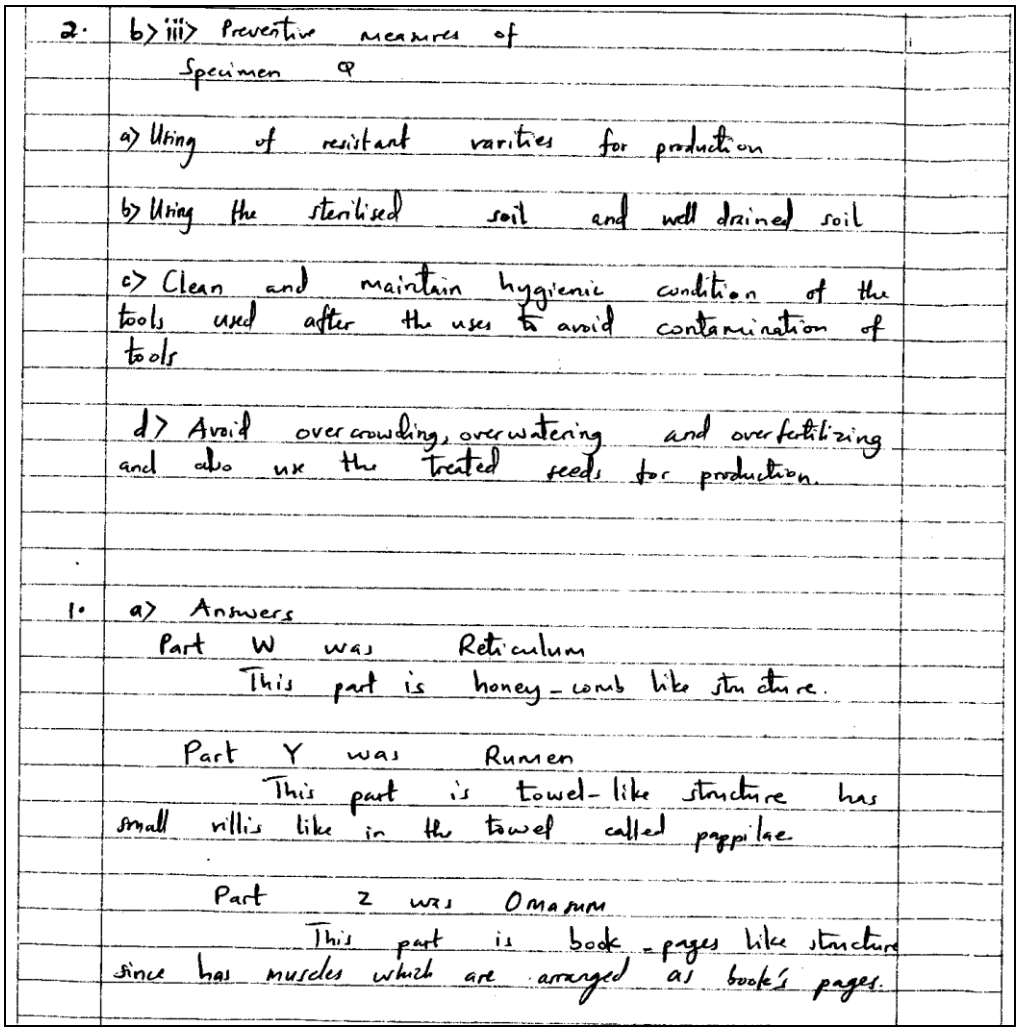
Specimen P

a) Using of resistant varieties

b) Using the well treated seeds of by fungicides

c) Prunning of the overcrowded leaves' plants to allow passage of sunlight to other leaves.

d) Destroying of affected plants or parts of plants.



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

Extract 11.1 shows responses from the candidates who performed well in the question demonstrating good understanding of the subject matter.

Moreover, data indicates that 57.52 per cent of the candidates had average performance. In part (a), the majority were able to design and carry out an experiment to verify that soil contains air. However, they faced difficulties in writing the report of the experiment. They only presented the procedures of the experiment. This suggests they had problems in writing a scientific experimental report. In part (b) (iii), some of the candidate included the preventive measures of downy mildew in control of powdery mildew. This

shows the candidates mixed up the preventive measures of powdery and downy mildew.

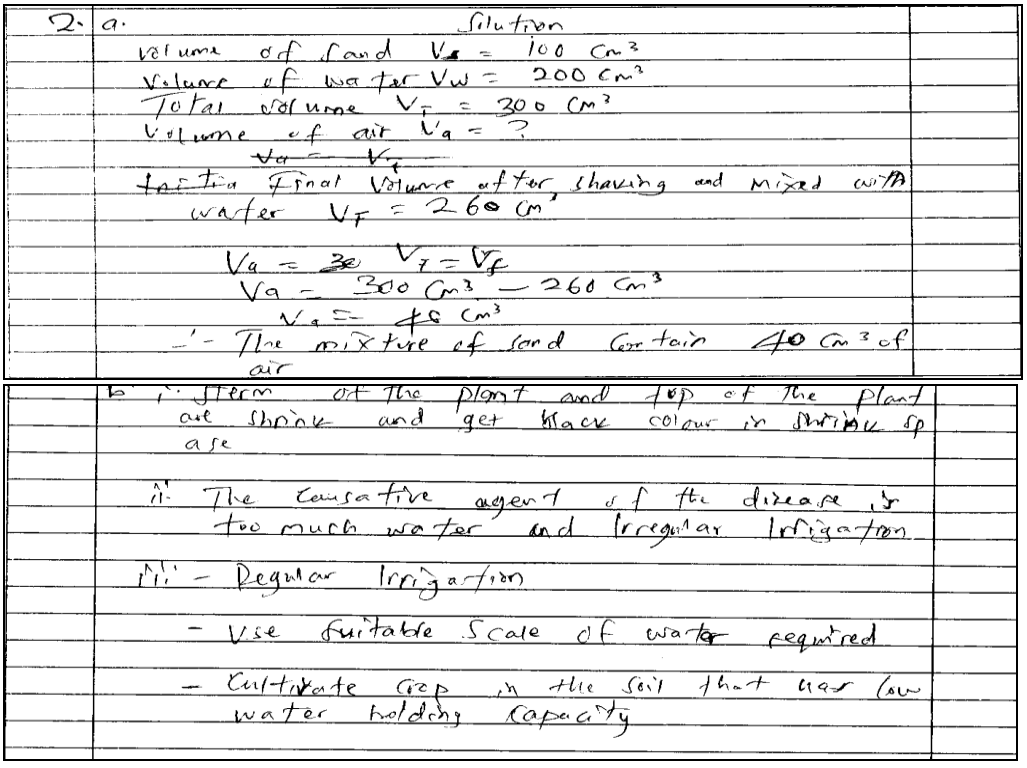
On the other hand, 32.49 per cent of the candidates had a weak performance. Most of them attempted incorrectly both parts of the question. In part (a), the majority failed to design and carry out experiment to verify that soil contains air. In view of this, they were also unable to write the report of the experiment. Examples of such incorrect responses given were the characteristics of sand soil such as; *it is well aerated, has low water holding capacity, it is well drained, has low nutrients content for plant growth and easy to cultivate*. Some described the soil constituents such as air, water, organisms, mineral matter, and organic matter. Others gave a variety of incorrect responses like; *bubbles were formed, there were floating of organic matter, the layers were formed through separate particles, the soil contain low organic matter content and sand soil can contain gravels*. The incorrect responses from the candidates indicate that, they lacked the knowledge and laboratory practical skills to verify that soil contain air.

Similarly, in part (b) (i) they were unable to point out the characteristic symptoms and the disease affecting each of the specimens **P** and **Q**. They provided incorrect responses such as; diseases-affecting specimen **P** were; *damping off, watery powder, white mildew, powdery wide and aphids. The characteristic symptoms provided were*; *the okra start to tear up itself, it is yellow-green in colour, drying of leaves, appearance of dark spot and wilting of leaves.* The diseases affecting specimen **Q** were *bacteria, smut, water soaking, blight* and *virus*. The characteristic symptoms were; *they produce flowers, they produce dormancy seed, they have two cotyledons, they have needle leaf, rotting of plants.*

In (b) (ii), the candidates failed to give the name of the causative agent of the diseases affecting specimens **P** and **Q**. They provided incorrect responses like; *lack of calcium, protozoans, mites, mosaic virus and bacteria*.

In part (b) (iii), they failed to suggest the preventive measures for the disease affecting **P** and **Q**. They provided incorrect responses for specimen P such as; *cover crops, we should put okra away from water, pesticides should be applied to control pests, use of drug, application of manure and use of antibiotics*. Incorrect responses for specimen **Q** were; *use of manure, mulching, liming, use of medicine and application of pesticides*. The candidates' response justifies

lack of knowledge and field practical skills of powdery mildew and dumping off diseases. Extract 11.2 illustrates a sample of incorrect responses on the question.


2. a. Solution
Volume of sand V_s = 100 cm^3
Volume of water V_w = 200 cm^3
Total volume V_T = 300 cm^3
Volume of air V_a = ?
$V_a = V_T$
Final Volume after shaving and mixed with water V_F = 260 cm
$V_a = V_T = V_F$
V_a = 300 cm^3 − 260 cm^3
V_a = 40 cm^3
∴ The mixture of sand contain 40 cm^3 of air

b i. Stem of the plant and top of the plant are shrink and get black colour in shrink up ase

ii. The causative agent of the disease is too much water and Irregular Irrigation

iii. - Regular Irrigation
- Use suitable Scale of water required
- Cultivate crop in the soil that has low water holding capacity

.

Extract 11.2: *Sample of the candidate's incorrect responses to Question 2.*

Extract 11.2 portrays responses from a candidate who responded incorrectly in all parts of the question. The candidate showed lack of knowledge and practical skills of the subject matter.

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

This section analyses the achievements of the candidates on each topic and field that were examined in this year's examination.

A total of 16 topics and 3 subject fields were examined in a theory and practical papers respectively. The topics examined were; *Mechanisation in Agriculture, Agricultural Development in Tanzania, Agricultural Marketing, Basics of Farm Management, Principles of Crop Production, Introduction to Livestock Production, Agroforestry, Animal Husbandry, Crop Husbandry, Introduction to Agriculture,*

Factors of Production, Introduction to crop production, Introduction to Soil Science, Farm Structures, Principles of Livestock Production and Contemporary Issues in Agriculture. The fields examined were; *Livestock Production, Crop Production* and *Soil Science.*

The analysis shows that the candidates had good performance on the topics of *Mechanisation in Agriculture, Agricultural Development in Tanzania, Agricultural Marketing, Basics of Farm Management, Principles of Crop Production, Introduction to Livestock Production, Agroforestry, Animal Husbandry* and *Crop Husbandry* in a multiple choice question with a general performance of 95.93 per cent. Other topics and fields with good performance were; *Introduction to Agriculture* (92.30%), *Principles of Crop Production* (81.92%), *Factors of Production* (78.28%), and *Soil Science and Crop Production* (67.51%). The good performance of the candidates is attributed to good understanding of the concepts in the questions.

The candidates performed averagely in the topics and field of *Introduction to Crop Production* (62.65%), Livestock Production (57.70%), Crop *Husbandry* (56.94%), *Introduction to Soil Science* (49.03%) and *Farm Structures* (46.86%). Inadequate understanding of the concepts contributed to such average performance.

On the contrary, the candidates had weak performance in the topics of *Principles of Livestock Production* (28.15%) and *Contemporary Issues in Agriculture* (20.09%). The weak performance of the candidates was caused by lack of understanding and misunderstanding of the concepts. The candidate's performance on each topic and fields is portrayed in the appendix.

4.0 CONCLUSION AND RECOMMENDATIONS

This section gives an overview of the analysis and proposes measures to be taken to improve candidates' performance in future examinations.

4.1 Conclusion

The performance statistics for the year 2023 examination in Agriculture subject indicated that 88.49 per cent of the candidates passed. Out of those who passed, 49.57 per cent attained high pass grades (A, B and C) and 38.94 per cent low pass grade (D). The candidates who failed were 11.51 per cent.

The analysis of the candidates' responses to the examination questions revealed lack of understanding, inadequate understanding and misunderstanding of the concepts were the main causes for scoring low marks by most students. Furthermore, inadequate practical skills contributed to the weak performance of the candidates in practical examination.

Misunderstanding of the concepts resulted in the provision of responses that were contrary to the demands of the question. Moreover, inadequate understanding of the concepts caused the provision of partially correct responses whereas lack of understanding of the concepts led to the provision of incorrect responses. Lack of practical skills resulted into failure in following practical procedures hence arrived at incorrect observations and results.

However, the candidates who scored high marks demonstrated good understanding of the concepts, which enabled them to meet the demands of the questions. In addition, exposure to practical facilitated the possession of adequate practical skills and consequently, the candidates performed well in practical examination.

4.2 Recommendations

Based on the findings of the analysis, the following are recommended to improve the candidates' performance:

(a) Teachers should use participatory and interactive methods where the students learn by doing a series of activities. The teacher should play a role of the facilitator in promoting and guiding students to ensure effective learning. For example:

(i) fieldwork can be used to broaden students understanding. Students can be engaged in the construction of livestock houses in school projects. In this case, they can understand more features to be considered in the construction of livestock houses on the topic of *Principles of Livestock Production* as students learn better by doing. Field work facilitates experimental learning, promotes a wide range of skills and competencies and bridges the gap between theory and practice. It makes students gain a deeper understanding by immersing in actual work environment.

(ii) study visits to develop and reinforce knowledge. For example, study visit to areas where practices of conserving the environment for sustainable agriculture are conducted. This can help students to acquire knowledge and skills of the practices enhancing sustainable agriculture on the topic of *Contemporary Issues in Agriculture* as students learn more by seeing. Study visit creates positive memories, reinforce and

expand knowledge, enables students to learn through experience and develops critical thinking.

(iii) teachers can use demonstrations to impart knowledge. For example, demonstration of the practices used to conserve the environment for sustainable agriculture. This can help the students to understand the practices as they learn much better by seeing and doing. Demonstration develop students' interest, helps them to remember, encourages critical thinking, enhances visual learning and get them involved.

(b) Besides teachers playing their basic role of executing proper teaching methods, students also have to engage actively in learning to make the teaching/learning process effective. This can be effected by thinking, discussing, investigating, practicing skills, explaining ideas, solving problems and making decisions.

(c) During the process of teaching and learning students should be regularly assessed. Assessment allows improvement of teaching, helps to monitor students' progress, helps to understand students' errors for remedy and motivate students to keep making progress.

(d) Evaluation of students' progress in learning should help teachers to identify the slow learners and provide them with appropriate support and guidance. It is important to recognise slow learners and address their needs for successful teaching and learning. This involves understanding their strength and weaknesses so that teachers can create special teaching experience to them by considering pace, interest and abilities. This makes learning more enjoyable and impactful.

Appendix: The Candidates' Performance in the Topics in CSEE 2023

S/N	Topic/Field	Question No.	Percentage of the candidates who scored an average of 30 per cent or above	Comments
1	Mechanisation in Agriculture, Agricultural Development in Tanzania, Agricultural Marketing, Basics of Farm Management, Principles of Crop Production, Introduction to Livestock Production, Agroforestry, Animal Husbandry and Crop Husbandry.	1	95.93	Good
2	Introduction to Agriculture	10	92.30	Good
3	Principles of Crop Production	9,3	81.92	Good
4	Factors of Production	11	78.28	Good
5	Soil Science and Crop Production	2 (P2)	67.51	Good
6	Introduction to crop production	5	62.65	Average
7	Livestock production	1 (P2)	57.70	Average
8	Crop Husbandry	2	56.94	Average
9	Introduction to Soil Science	6	49.03	Average
10	Farm Structures	7	46.86	Average
11	Principles of Livestock Production	4	28.15	Weak
12	Contemporary Issues in Agriculture	8	20.09	Weak