THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

STUDENTS' ITEM RESPONSE ANALYSIS REPORT ON THE FORM TWO NATIONAL ASSESSMENT (FTNA) 2023

AGRICULTURE

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034 AGRICULTURE

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FOREWORD

This report presents Students' Item Response Analysis (SIRA) on the Form Two Agriculture National Assessment, which was conducted in November 2023. The report aims to provide feedback to education stakeholders on the factors that contributed to the students' performance in Agriculture.

The Form Two National Assessment (FTNA) is a formative evaluation that intends to monitor students' learning to provide feedback that teachers, students and other education stakeholders can use to improve teaching and learning respectively. The report points out reasons for the good and weak performance of the students in 2023 Agriculture assessment. Good performance was attributed to a good understanding of the concepts of the subject matter whereas poor understanding and misunderstanding of the same contributed to the weak performance of the students. Moreover, the report indicates that poor English language proficiency was a reason for most of the students' weak performance in the assessment.

The report will help students identify their strengths and weaknesses important for them to improve learning before sitting for the Certificate of Secondary Education Examination (CSEE). It will also help teachers to identify the challenging areas and respond appropriately during teaching and learning.

The National Examinations Council of Tanzania (NECTA) expects that the feedback provided in this report will express the critical issues and challenges for which education stakeholders should design and take proper measures to improve teaching and learning of the Agriculture subject. Consequently, students will acquire knowledge, skills and competence indicated in the syllabus for better performance in future assessments and examinations and functioning in their society.

The Council appreciates the contribution of all those who participated to the preparation of this report.

Dr. Said Ally Mohamed
EXECUTIVE SECRETARY

1.0 INTRODUCTION

This report presents the analysis of students' performance in FTNA 2023 in Agriculture subject. The assessment was set following the 2021 assessment format that is based on the 2019 Agriculture Syllabus.

The assessment had one theory paper of 2:30 hours duration with ten questions, which were organized in sections A, B, and C. As per instructions, students were required to answer all questions. On the nature of the questions, section A had two objective questions, question one was composed of 10 Multiple Choice items and question two had five Matching Items. In terms of weight, question one carried 10 marks whereas question two carried five marks. In total, section A carried 15 marks. Section B comprised seven short answer questions each carrying 10 marks making a total of 70 marks. Section C had one essay question carrying 15 marks. The paper weighed 100 marks.

The students registered to sit for this year's national assessment were 29,029 from 301 centres. The statistics indicate that 27,030 (93.11%) students sat for the assessment of which 10,603 (39.24%) passed and 16,419 (60.74%) failed. The general performance was average. Table 1 shows the performance of the students in FTNA in Agriculture subject in 2022 and 2023.

Table 1: Students' Performance in FTNA 2022 and 2023

Year	Grades	A	B	C	D	F	Withheld	Total	PASSED
2022	Male	176	299	1,801	2.874	5,603	3	10,753	38.88
	Female	48	179	1,148	2,755	8,987	13	13,133	
	Total	**224**	**478**	**2,949**	**5,629**	**14,590**	**16**	**23,886**	
2023	Male	218	398	2,075	3,027	6,650	2	12,370	39.24
	Female	111	191	1,400	3,183	9,769	6	14,660	
	Total	**329**	**589**	**3,475**	**6,210**	**16,419**	**8**	**27,030**	

Source: NECTA Statistics Book, **pg 6**, FTNA (2023)

As indicated in Table 1, the performance of the students has increased by 0.36 per cent in 2023 compared to performance in 2022. Likewise, the percentage of students who scored high grades (A, B and C) has increased by 0.96 per cent in 2023 (16.25%) as compared to 2022 (15.29%).

The students' results in this assessment were categorized into five grades namely A, B, C, D and F. Each grade had a respective score interval and

remarks as follows: Grade A had a score interval of 75-100 (Excellent); Grade B had a score interval of 65-74 (Very good); Grade C had a score interval of 45-64 (Good); Grade D had a score interval of 30-44 (Satisfactory) and Grade F had a score interval of 0-29 (Fail).

In this report the analysis has grouped the performance into three categories namely good (65-100), average (30-64) and weak (0-29). Three colours (green, yellow and red) have been used to indicate good, average and weak performance respectively.

The following sections present the analysis of the students' performance in each question and topic. The report also includes a conclusion and recommendations that provide an overview of the analysis and suggestions to improve students' performance in future assessments.

2.0 THE ANALYSIS OF THE STUDENTS' PERFORMANCE ON EACH QUESTION

This section presents the analysis of the students' performance on each question whereby the topics assessed are also presented. For clarity, the analysis describes the demands of each question, the overall students' performance for each question, their responses and possible contributing factors for their performance. Samples of students' responses from scripts and graphs are presented for illustrations.

2.1 SECTION A: OBJECTIVE QUESTIONS

2.1.1 Question 1: Multiple - Choice Items

The question was composed of ten multiple-choice items derived from the following topics: *Factors of Production*, *Basics of Farm Management, Introduction to Soil Science*, *Crop Husbandry*, *Introduction to Agriculture*, *Introduction to Livestock Production*, *Principles of Crop Production*, *Mechanisation in Agriculture* and *Introduction to Crop Production*. Each item carried one mark making a total of 10 marks. The students were required to choose a correct answer from the four given alternatives and write its letter in the box provided.

The question was attempted by all 27,030 (100%) students whereby 6,504 (24.06%) scored from 0.0 to 2.0 marks; 18,985 (70.24%) from 3.0 to 6.0

marks and 1,541 (5.70%) from 7.0 to 10 marks. Figure 1 shows the distribution of students' scores on the question.

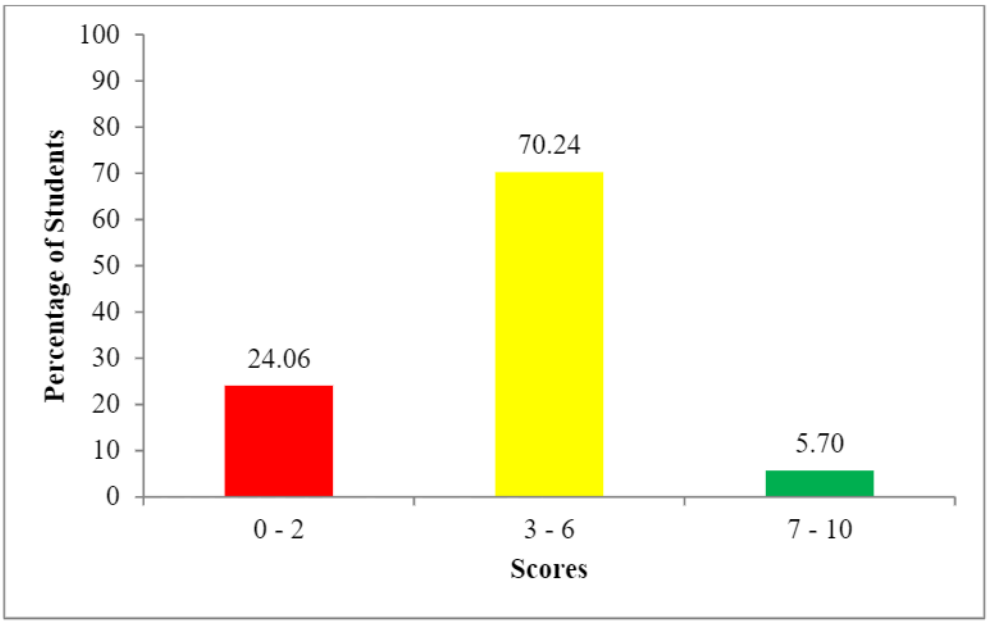


Figure 1: *Students' performance on Question 1*

Referring to Figure 1, most of the students (75.94%) scored from 3.0 to 10 marks and 24.06 per cent from 0.0 to 2.0 marks. The general performance was good.

Further, the analysis of the students' responses showed that most of the students responded correctly to items (i), (ii), (iii), (iv), (vi), (vii), (viii), and (ix) and incorrectly to items (v) and (x). The analysis of the students' responses in each item is as follows:

In item (i), the students were required to choose an option which represents the soil texture that can be noticed with a gritty feel when rubbing the soil between the thumb and fore finger. The question tested students' knowledge and skills of soil texture on the topic of Introduction to Soil Science. The correct response was C (sand). The distractors were A (clay), B (loam) and D (clay loam). The majority of the students chose the correct option signifying possession of adequate knowledge and skills on the concept of soil texture. Option A (clay), when this type of soil is rubbed between the forefinger and thumb, it is sticky when wet, stains fingers, clouds water, usually very sticky with stickiness masking both smoothness and grittiness.

This was not a correct option because of its smoothness property. Option B (loam) on one hand, clods slightly, difficult to break and somewhat gritty. Loam soil was not a correct option because the soil has the characteristic of being difficult to break which does not meet the requirement of the question. Likewise, option D (clay loam) on the other hand, feels somehow gritty when rubbed, clods slightly and is difficult to break. This does not fit to be a correct option due to smooth feel characteristics.

Item (ii) required the students to choose an alternative, which is the main function of legume crops in the crop rotation system. This item examined the students' understanding of the role of legumes in crop rotation on the topic of *Introduction to Crop Production*. The correct option was D (to improve soil fertility). The incorrect alternatives were A (to cover the soil), B (to increase soil aeration) and C (to improve soil temperature). The majority of the students chose the correct response for the main function of legume crop in crop rotation showing a good understanding of the concept of crop rotation. Legume crops help to fix atmospheric nitrogen in the soil, also when their green parts and roots decay, release nitrogen which can be used by other crop plants in the successive cropping season. Hence, improves soil fertility. Option A (to cover the soil), can be done by using cover crops such as pumpkins and sweet potatoes. Although legume crops can cover the soil, it is not its main or intended function. Option B (to increase soil aeration), is done by improving the soil structures through some crops which have strong and deep roots that can break hard pans, and deep layers of soil and penetrate the soil to create tiny holes that allow free air circulation. Soil aeration can also be improved by the addition of organic matter into the soil. Option C (to improve soil temperature), can be improved through tillage which breaks the soil pan allowing sun rays to penetrate the soil as well as allowing excessive heat to escape out of the soil. Legume crops do not improve soil temperature due to their growth habit which limits solar radiations from penetrating through the soil.

In item (iii), the students were required to propose from the alternatives, the breed of cattle to be purchased by the farmer when establishing a dairy farm. The item tested the students' knowledge of the breeds of cattle on the topic of *Introduction to Livestock Production.* The correct response was C (Friesian) whereas the incorrect alternatives were A (Hereford), B (Charolais) and D (Aberdeen Angus). The majority of the students

responded correctly to the item by proposing the correct breed of cattle for establishing a dairy farm indicating a good understanding of cattle breeds. They were able to identify Friesian as dairy cattle while options A (Hereford), B (Charolais) and D (Aberdeen Angus) are exotic beef cattle breeds.

Item (iv) required the student to choose an alternative which is the term describing the process whereby nutrients are dissolved and carried far away beyond the root zone due to heavy rain or irrigation. The item assessed the students' understanding of the causes of the loss of soil fertility on the topic of *Principles of Crop Production*. The correct response was B (leaching). The distractors were A (erosion), C (burning) and D (capping). A large proportion of the students responded correctly to the item indicating that they were knowledgeable on the causes of loss of soil fertility. Option A (erosion) is the act of carrying away the top soil by moving water or wind and being deposited in another place which was not intended. On the other hand, option C (burning) is the process whereby organic matter is destroyed in such a way that the protective layer of vegetation is lost and the ground is exposed to agents of soil erosion. Option D (capping), is the act of covering the top of the soil with crop residues after harvesting.

In item (v), the students were required to choose an alternative which are the types of labour that are mostly used in Tanzania. The item tested the students' knowledge of labour as a factor of production. The correct response was C (family) and (unskilled). The distractors were A (family) and (hired), B (hired) and (skilled) and D (skilled) and (unskilled). The majority of the students performed poorly in this item as they failed to provide the correct option for the types of labour that are mostly used in the Tanzanian context. This shows that they had inadequate knowledge of the common types of labour used in Tanzania. Most of them opted for alternative D (skilled) and (unskilled). This was not the correct option because most of the labour found in Tanzania is unskilled. Option A (family)and (hired), family is the type of labour mostly used in Tanzanian as it is less costful while hired is too costful for most farmers. Option B (hired) and (skilled) do not apply to the Tanzanian context because it is costful therefore the farmers cannot afford them. However, few students managed to provide the correct option which is C; family and unskilled had enough knowledge of labour as a factor of production. This indicates that, in the

Tanzanian context, most farmers prefer family and unskilled labour because it is cheap.

In item (vi), the students were required to choose an alternative which is the upper part of the new plant from the demonstration of grafting shown by the teacher. The item tested the students' knowledge and skills of planting on the topic of *Principles of Crop Production*. The correct option was A (scion). The incorrect alternatives were B (top graft), C (root stock) and D (bud). Most of the students gave correct responses indicating a good understanding of the propagation methods. A scion is a small piece of shoot which is cut from the tree with desirable stem characteristics such as big good fruits and the ability to bear many fruits. Option B (top graft) was an incorrect response because it is the changed tree from one cultivar to another through grafting. On the other hand, C (rootstock), is the part of the plant with a root system having good characteristics such as draught resistance, ability to grow well even on poor soils and resistance to soil diseases which is joined with a scion during grafting. This was not the correct option because it is the one in which a scion is inserted and D (bud), is the part of the plant growing into a branch which is cut and inserted into a rootstock to form a new plant by a technique known as budding.

In item (vii), the students were required to identify the statement which is true about soil porosity. The item tested students' knowledge of the concept of soil porosity on the topic of *Introduction to Soil Science*. The correct response was C (small-sized soil particles have less pore space than large-sized particles). The distractors were A (sandy soils have higher total pore space), B (porosity of surface soil decreases as particle size increases) and D (presence of organic matter in the soil decreases the porosity of the soil).

Most of the students chose the correct response for a true statement about soil porosity justifying a good understanding of the subject matter. The term soil porosity refers to the percentage of soil volume that is occupied by water and air. Option A was incorrect because with regard tothe relationship between surface area to volume ratio, sand soil has large pore space but not higher total pore space, therefore the word total pore space changed the correctness of the response. Likewise, in option B; the porosity of surface soil decreases as particle size decreases. Furthermore, distractor D; the presence of organic matter in the soil decreases the porosity of the soil was incorrect because the presence of organic matter increases the porosity.

Item (viii) demanded the students to choose the alternative that shows how trap cropping as a cultural pest control method functions. The item examined the students' knowledge of pest control methods on the topic of *Principles of Crop Production*. The correct response was A (suppress pest population). The distractors were B (kills all the pests), C (weakens the pests) and D (repel the pests). Most of the students managed to choose the correct response showing a good understanding of trap cropping as the pest control method. Trap cropping is the practice of using plants which are normally not seriously attacked by crop pests. Such plants can be interplanted with the main crop plant or on the boundaries of the field. The pests tend to be attracted by such crops as a result they do not attack the main/targeted crop. When the insects attack and feed on the trap crops, spraying insecticide on trap crops will eventually kill them. In such a way, the pest population are suppressed. The distractor B; kills all the pests; usually, trap cropping does not kill all the pests directly. In the same way, distractor C; weakens the pests; trap crops if not poisonous cannot weaken the pests directly until they are sprayed with pesticides. Moreover, distractor D; repels the pests; trap crop does not scare away the pests therefore there is no way the pests can be repelled.

In item (ix), the students were required to choose an alternative that represents the correct class of cotton and coffee crops. The item tested the students' knowledge of the Classification of Agricultural Crops on the topic of *Introduction to Crop Production*. The correct option was D (cash crops) whereas alternatives A (oil crops), B (ornamental crops) and C (beverage crops) were incorrect responses. Most of the students chose the correct response signifying possession of adequate knowledge of the classification of crops. Cash crops including coffee and cotton are crops that are grown for earning an income. Oil, ornamental and beverage crops do not meet the demand of the question although can also be sold to earn income.

Most of the students chose the correct response signifying possession of adequate knowledge of classification of agricultural crops. Cash crops including coffee and cotton are crops that are grown for earning an income. Oil crops, ornamental crops and beverage crops do not meet demand of the question although can also be sold to earn income.

In item (x), the students were required to opt for the correct method of controlling bean disease characterized by the appearance of brown or black

spots on the lower surfaces of the leaves. The item examined students' knowledge and skills of crop plant diseases on the topic of *Crop Husbandry*. The correct response was B (destruction of crop residuals). The distractors were A (uprooting infected plants), C (use of bactericides) and D (early planting). The majority of the students failed to provide the correct response indicating inadequate knowledge of the method of controlling the disease affecting bean plants. Most of them were attracted to option A; uproot infected plants. This involves removing affected plants by uprooting without destroying them thus it cannot be an effective way of controlling the disease. Option C, use of bactericides is incorrect because the disease affecting bean plants is caused by fungi. Option D; early planting; although it is one of the cultural methods of controlling crop diseases it cannot be one hundred percent effective that the pathogens will not occur again. However, those few students who performed well in this part managed to provide the correct option; destruction of crop residues indicating good possession of knowledge and skills of the method of controlling the disease affecting bean plants. Destruction of crop residues completely kills the pathogens by burning them.

2.1.2 Question 2: Matching Items

The question consisted of five items from the topic of Crop Husbandry. Each item carried one mark making a total of five marks. The students were required to match the items in List A with their corresponding responses in List B by writing a letter of a correct response from List B below the corresponding item number in List A. List A consisted of five symptoms of crop diseases whereas List B consisted of seven types of plant diseases. The objective of this question was to test students' understanding of different types of plant diseases.

List A	List B
(i) White or grey substances on the leaves and stems	A Blight
(ii) Seedlings appear as if they were water-soaked	B Dumping off
(iii) Mass of soot on some parts of plants	C Mosaic
(iv) Plant tissues wilt and die suddenly	D Downy mildews
(v) Yellowing of the leaves on the margin and the areas between veins	E Rosetting
	F Smuts
	G Root rot

The question was attempted by 27,030 (100%) students whereby 21,201 (78.43%) scored from 0.0 to 1.0 mark, 5,576 (20.63%) from 2.0 to 3.0 marks and 253 (0.94%) from 4.0 to 5.0 marks. Figure 2 represents the scores of the students on the question.

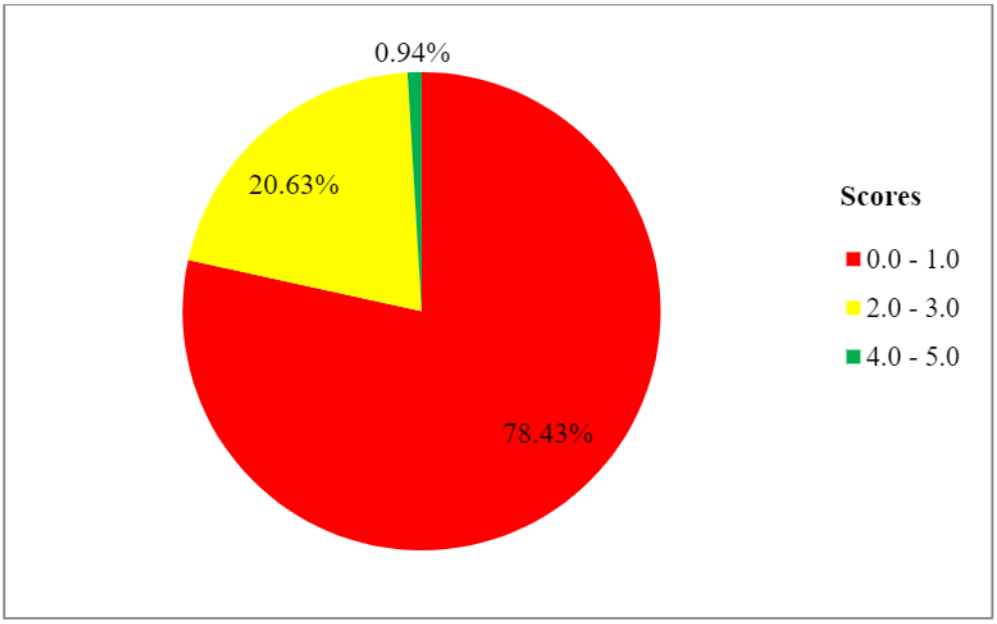


Figure 2: *Students' performance on Question 2*

Figure 2 shows that 78.43 per cent of the students scored from 0.0 to 1.0 mark whereas 21.57 per cent from 2.0 to 5.0 marks. The general performance in the question was weak. The analysis of students' responses showed that items (ii) and (iii) were attempted correctly by most of the students whereas items (i), (iv) and (v) were incorrectly attempted. Analysis of students' responses to each item is provided here under:

In item (i), most of the students guessed the correct response by choosing a variety of incorrect responses for the disease which is characterised by white or grey substances on the leaves and stems. The correct response was D (Downy mildew). The provision of incorrect responses signifies a poor understanding of the disease.

In item (ii), the majority of the students managed to choose the correct response for the disease that is characterised by seedlings appearing as if they were water-soaked. The correct response was B (Dumping off). This signifies students' understanding of the disease.

In item (iii), most of the students chose the correct response for the disease that is symptomised by a mass of soot on some parts of the plant. The correct response was F (Smut). This indicates that students were knowledgeable of the disease.

In item (iv), the majority of the students failed to choose the correct response for the disease that is characterised by plant tissues wilting and dying suddenly. The correct response was A (Blights) signifying students' poor understanding of the disease.

In item (v), most of the students chose incorrect responses for the disease that is symptomised by yellowing of the leaves on the margins and the area between veins. The correct response was C (Mosaic). Reflection on the responses seems to suggest that the students were not familiar with the disease. Generally, the diseases in List B had peculiar characteristics. For this reason, the students were not attracted to specific responses but they had to guess for the correct responses.

2.2 SECTION B: SHORT ANSWER QUESTIONS

2.2.1 Question 3: Introduction to Livestock Production

The question consisted of parts (a) and (b) carrying 10 marks. The students were required to: (a) explain how nomadic pastoralism is practiced and (b) suggest four ways that can be adapted to overcome the challenges of land disputes facing nomadic pastoralism when looking for grazing areas. The question aimed to test students' understanding of the system of nomadic pastoralism.

The question was attempted by 27,030 (100%) students out of which 16,484 (60.98%) scored from 0.0 to 2.5 marks, 6,920 (25.60%) from 3.0 to 6.0 marks and 3,626 (13.42%) from 6.5 to 10 marks. Figure 3 depicts the students' scores on the question.

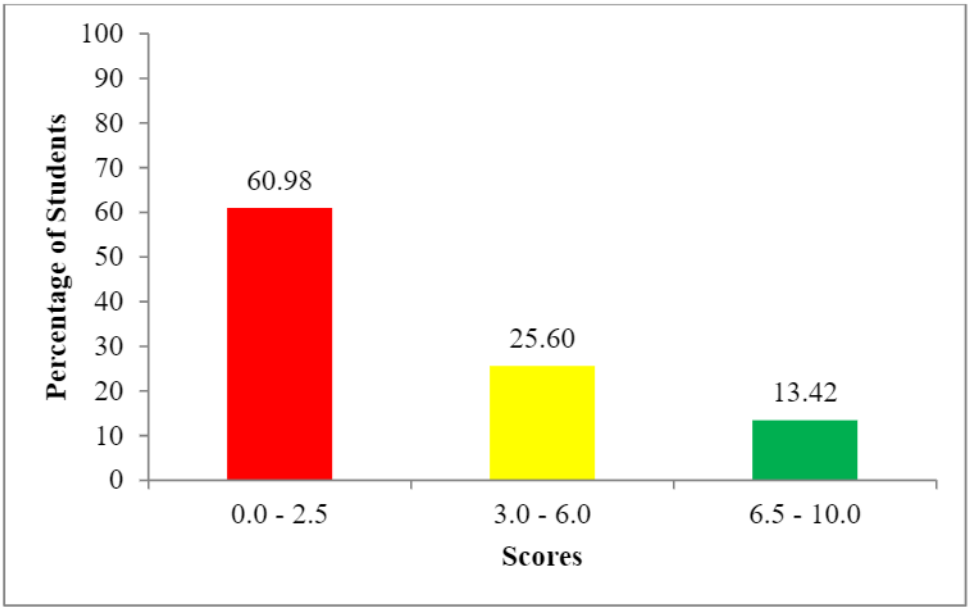
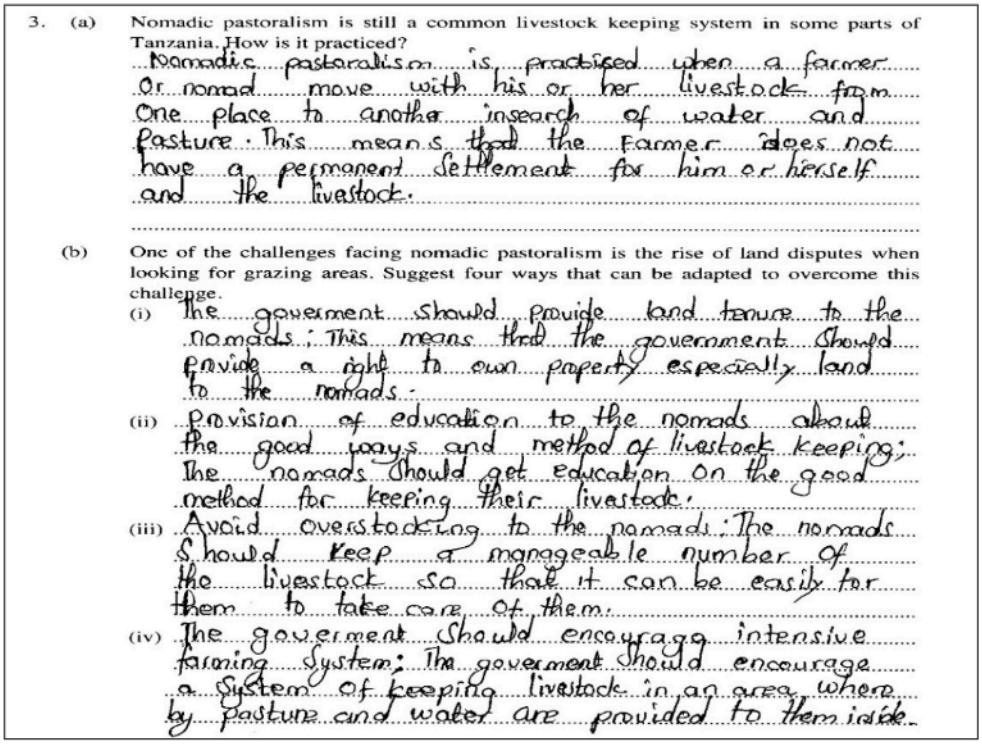


Figure 3: *Students' performance on Question 3*

As indicated in Figure 3, 39.02 per cent of the students scored from 3.0 to 10 marks while 60.98 per cent from 0.0 to 2.5 marks, a performance which is generally average.

Data indicate that, 13.42 per cent of the students did well in the question. The majority of students provided correct responses in both parts of the question. In part (a), the students managed to give correct explanations of how nomadic pastoralism is practiced. The provided correct response was *nomadic pastoralism is practiced by movement of livestock keepers from one place to another with their livestock while searching for grazing land (pastures and water).* They normally do not have permanent settlement. This signifies that, the students had a good understanding of the practice of nomadic pastoralism. Likewise, in part (b) the students provided correct responses on the ways that can be adopted to overcome challenges of land disputes facing nomadic pastoralism. The correct responses were:- *having a land use plan which shows the agricultural areas and livestock keeping areas, educating people on the necessities of having legal land ownership, forming resolution groups to talk about land conflicts and how to avoid them, respecting one another's production activities to enhance good relationship, land conflicts should be addressed and discussed by involving various stakeholders like pastoralists, farmers, government officials and politicians.*

There should also be development of infrastructures and provision of social services to allow pastoralists to settle and pursue their livelihood while educating them on how to establish pastures. These correct responses justify possession of adequate knowledge from the students. Extract 1.1 is an example of correct responses to the question.



3. (a) Nomadic pastoralism is still a common livestock keeping system in some parts of Tanzania. How is it practiced?

Nomadic pastoralism is practiced when a farmer or nomad move with his or her livestock from one place to another insearch of water and pasture. This means that the farmer does not have a permanent settlement for him or herself and the livestock.

(b) One of the challenges facing nomadic pastoralism is the rise of land disputes when looking for grazing areas. Suggest four ways that can be adapted to overcome this challenge.

(i) The goverment should provide land tenure to the nomads; This means that the government should provide a right to own property especially land to the nomads.

(ii) Provision of education to the nomads about the good ways and method of livestock keeping; The nomads should get education on the good method for keeping their livestock.

(iii) Avoid overstocking to the nomads; The nomads should keep a manageable number of the livestock so that it can be easily for them to take care of them.

(iv) The goverment should encourage intensive farming system; The goverment should encourage a system of keeping livestock in an area where by pasture and water are provided to them inside.

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

Extract 1.1 shows responses from the one of students who attempted well in all parts of the question. This shows that the student was knowledgeable on the concept of nomadic pastoralism.

The students who had an average performance in the question were 25.60 per cent. The majority provided a correct response in part (a) on how nomadic pastoralism is practiced. In part (b), the most of students were unable to provide all correct responses for ways of overcoming challenges of land disputes facing nomadic pastoralism. This shows that they have acquired insufficient knowledge of the challenges facing the system.

On the other hand, 60.98 per cent of the students had a weak performance. The majority of them performed poorly in almost all parts of the question.

They were unable to explain how nomadic pastoralism is practiced in part (a).

Most of their responses focused on different types of animal keeping like *cattle farming, goat farming, poultry farming* and *sheep farming*.This suggests the students were not familiar with the system of nomadic pastoralism. Likewise, in part (b) the students failed to suggest the ways to be adopted to overcome the challenges of land disputes facing nomadic pastoralism. Some of them did not understand the demand of the question; instead, they provided the factors affecting livestock production such as *poor livestock management, poor source of capital to buy quality breed*, *poor knowledge of good husbandry, and presence of parasites and diseases*. Others provided different classes of livestock and their products like *poultry produce eggs and meat, cattle for production of meat, milk and good manure, gots produce meat and milk, pigs for meat*. A few students referred normal urban land disputes and came up with solutions like *going to court* and *land councils*. This shows that students lacked knowledge of the ways to overcome challenges facing nomadic pastoralism. Extract 1.2 is a sample of incorrect responses to the question.

3. (a) Nomadic pastoralism is still a common livestock keeping system in some parts of Tanzania. How is it practiced?

Nomadic pastoralism in livestock keeping system in Tanzania' as the parts of the livestock keeping in Tanzania and the livestock as the types of Livestock keeping in Tanzania' and the nomadic pastolalism in Tanzania' en the animal and reating keeping in animal of Tanzania'

(b) One of the challenges facing nomadic pastoralism is the rise of land disputes when looking for grazing areas. Suggest four ways that can be adapted to overcome this challenge.

(i) Animal for the reating keeping'
The nomadic pastoralism in Tanzania' was animal and livestock in Tanzania' for the reating keeping in animal

(ii) Animal for the income
The nomadic pastoralism in Tanzania was the livestoc in Tanzania and the reating keeping of animal.

(iii) Animal for the food.
The livestock was types of this livestock keeping in animal is nomadic pastoralism in Tanzania have the animal as in Tanzania

(iv) Animal for the employment
The animal keeping of nomadic pastorali' sm in Tanzania and the reating keeping in animal of Tanzania'

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

Extract 1.2 illustrates a sample of incorrect responses from a student who lacked knowledge of the subject matter. In part (a) the responses provided using poor English language reflected types of animal keeping whereas in part (b) the responses focused on the importance of keeping animals.

2.2.2 Question 4: Introduction to Agriculture

The question had parts (a) and (b) carrying a total of 10 marks. The students were required to:(a) support with five examples the statement that agriculture is regarded as both science and an art and (b) support with five points on how the advancement in science and technology has contributed to the

development of the agricultural sector in Tanzania. The question examined the students' knowledge of the concept of agriculture and its development.

The question was attempted by 27,030 (100%) students whereby 20,115 (74.42%) scored from 0.0 to 2.5 marks, 5,699 (21.08) from 3.0 to 6.0 marks and 1,216 (4.50%) from 6.5 to10 marks. Figure 4 summarises the students' scores on the question.

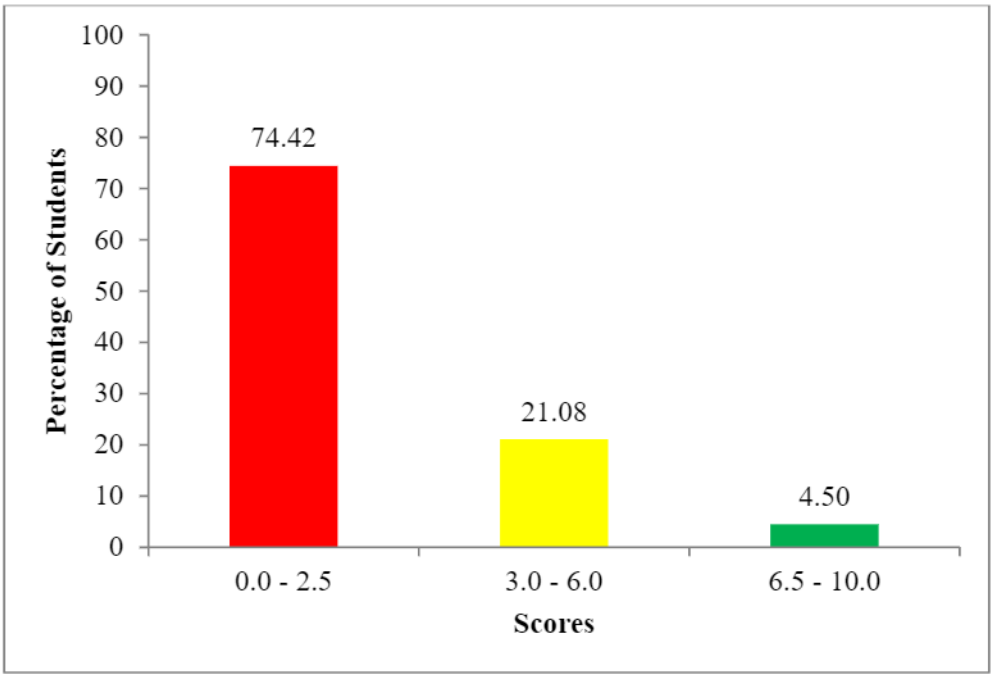


Figure 4: *Students' performance on Question 4*

According to Figure 4, 74.42 per cent of the students scored from 0.0 to 2.5 marks and 25.58 per cent from 3.0 to 10 marks. Generally, the performance of the students in the question was weak.

The statistics show that 74.42 per cent of the students performed poorly on the question. Most of them responded incorrectly in nearly all parts of the question. In part (a), they were unable to support the statement with examples; agriculture is both an art and a science. Some of the students elaborated the statement by incorporating other science and art subjects such as *physics is the branch of science which deals with relation to energy, biology is the branch of science which deals with living things and life, chemistry is the branch of science which deals with composition and decomposition of matter, geography is the study of human being and his*

surroundings and *history is a study of human events*. The findings indicate that students in this case misunderstood the concept of relating Agriculture with other science and art subjects. Other students tried to define the terms science and art for example *science is the study of nature, art is the study of using the human power*. Other incorrect responses provided focused on the importance of Agriculture such as *source of employment, source of food, source of income, source of livelihood to people, source of raw materials for industry and source of market for industrial goods*. This signifies a lack of profound understanding of the concept used. Likewise, in part (b) most of the students did not understand the contribution of science and technology to the development of the agricultural sector. Most of their responses targeted the role of agriculture in the economic development of a country. Extract 2.1 is a sample of incorrect responses to the question.

4. (a) In the practice and understanding of farming, agriculture is regarded as both science and an art. Support this statement with five examples.

fishing

tourism

Marketing

forest

Mining

(b) The advancement in science and technology has contributed to the development of agricultural sector in Tanzania in many ways. In five points, support this statement by giving examples.

(i) Source of foreign exchange

(ii) Source of employment.

(iii) source of income

(iv) sorce of food

(v) source of development opportunities

Extract 2.1: *A sample of the student's incorrect responses to Question 4*

Extract 2.1 shows a sample of incorrect responses from a student who lacked knowledge of the subject matter in all parts of the question. In part, (a) the student mentioned general economic activities while in part (b) he/she provided the importance of agriculture.

Further analysis depicts that 21.08 per cent of the students had an average performance. The majority of them managed to provide answers on the contribution of science and technology in the development of the agricultural sector in part (b). This justifies a good understanding of the subject matter. However, in part (a) most of them failed to give reasons why agriculture is considered to be a science and an art. Most of their responses related agriculture to other science and art subjects such as biology, chemistry and geography. This indicates poor mastery of the subject matter.

On the contrary, 4.50 per cent of the students had a good performance. The majority did well in all parts of the question. In part (a), they managed to explain why agriculture is regarded as both an art and a science by giving responses such as; it includes *procedures in the scientific investigation process like observation of the problem, formulation of the hypothesis to determine possible cause of the problem, experimentation to investigate cause of the problem, collection of data from the experiment, analysis of the collected data and to conclude*. As an art; *it involves the attractive skills of production in agriculture. For example, milking, designing row sowing, pruning of the fruit trees and ploughing which will attract the viewers*. Their responses signify a good understanding of agriculture being a science and art art.

Similarly, in part (b), the students showed a good understanding of the subject matter by giving correct responses on how advancement in science and technology has contributed to the development of the agricultural sector in Tanzania. Examples of the correct responses given by the students include *enhancing the adoption of improved crops and livestock husbandry such as breeding techniques, facilitating the development of agrochemicals such as herbicides, pesticides and fertilizers, enabling the development of vaccines, facilitating the use of machines in doing agricultural work, access to market information through technologies, enables the farmers to make correct production decisions, weather forecast enables farmers to plan for production, makes the availability of improved seeds, enhance the development of crop varieties and animal breeds that are resistant to pests diseases and parasites*. The responses from the students indicate a good understanding of the contribution of the advancement of science and technology to the development of the agriculture sector. Extract *2.2* is an example of correct responses to the question

4. (a) In the practice and understanding of farming, agriculture is regarded as both science and an art. Support this statement with five examples.

i. The use of scentific principles. The use of scentific principles make Agriculture to be a science.

ii. The development of different livestock breeds. The development of different breeds make agriculture be a science.

iii. The use of different machinery and implements. The use of this machinery and implement make Agriculture science.

iv. The use of individual skills and knowledges. The use of individual knowledge and skills make agriculture an art.

v. The ability of an individual to design a production make an agriculture to an art.

(b) The advancement in science and technology has contributed to the development of agricultural sector in Tanzania in many ways. In five points, support this statement by giving examples.

(i) Lead to the simplity of agricultural process by the use of different machinery and implements. The development of science and technology lead to the introduction of machinery and implements which simplify agricultural operation.

(ii) Lead to the increase of production by development of new breeds of livestocks. The development of new breeds of livestocks lead to the increase of production of products such as milk, meat and eggs.

(iii) Leads to control of pests and diseases ~~by~~ and weeds by application of pestrides and herbecides. The development of science and technology which lead to the introduction of pestrides help to control weed diseases and pests.

(iv) It simplify marketing of farm produce due to the use of mass media. The use of mass media is among of the development of science and technology which simplify the marketing of crop produce and animal products.

(v) It simplify the distribution of different Agricultural inputs. The development of science and technology lead to simplify the distribution of inputs used in agricultural ~~inputs~~ process in fact.

Extract 2.2: *A sample of the student's correct responses to Question 4*

Extract 2.2 is a sample of responses from the student who attempted well all parts of the question signifying good mastery of the subject matter.

2.2.1 Question 5: Mechanization in Agriculture

The question comprised parts (a) and (b) carrying a total of 10 marks. The students were required to: (a) suggest four factors causing low adoption of agricultural mechanization by farmers in Tanzania and (b) propose four strategies that can be used to improve the adoption of agricultural mechanization in Tanzania. The question evaluated students' understanding of the concept of agricultural mechanization.

The question was attempted by 27,030 (100%) students out of which 15,845 (58.62%) scored from 0.0 to 2.5 marks, 8,515 (31.50%) from 3.0 to 6.0 marks and 2,670 (9.88%) from 6.5 to 10 marks. Figure 5 presents the students' scores on the question.

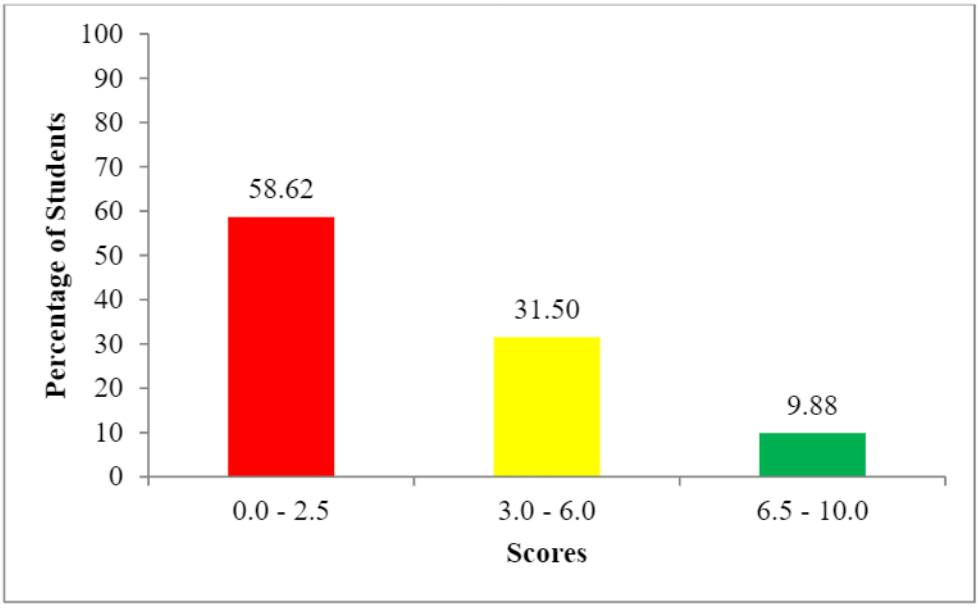


Figure 5: *Students' performance on Question 5*

As per Figure 5, 41.38 per cent of the students scored from 3.0 to 10 marks and 58.62 per cent from 0.0 to 2.5 marks. The general performance in the question was average. The statistics show 9.88 per cent of the students had a good performance and most of them did well in almost all parts of the questions. In part (a), they managed to suggest factors that cause low adoption of agricultural mechanization by farmers.

Examples of such responses include *social-economic factors, technical and educational factors*, *cropping systems*, *subsistence farming*, *poor credit and loan facilities for farmers*, *poor market facilities for agricultural produce and topographic factors*.

Furthermore, in part (b) the students managed to propose the strategies to be used to improve the adoption of agricultural mechanization. The responses given were *agricultural extension officers should provide training to farmers on the skills of using modern farm machinery, there should be farmer field schools or demonstration plots to train farmers on the effectiveness of agro mechanisation for enhancing agriculture production, the farmers should be emphasized to form groups that can be financed by the government for purchasing modern agricultural machinery, the government should improve the markets of agricultural produce, farmers should expand their farms for food production to maximise profit*. The students' correct responses show that they had sufficient knowledge of the subject matter. Extract 3.1 is an example of correct responses to the question

5. Agricultural mechanization is one of the strategies to improve agricultural production in Tanzania. However, the farmers' adoption of agricultural mechanization is still low in most parts of the country due to various factors.

(a) Suggest four factors causing low adoption of agricultural mechanization by farmers in Tanzania.

(i) low level of education and technology. The low level of technology and education development is the most factors which causing farmers adoption of agricultural mechanization still low.

(ii) Economic status. The implements and tools such as tractors need high capitals in order to buy it. Many farmers have small capitals which lead to low investation on agricultural mechanization.

(iii) Small size of farms. The small sizes of farms it cause the application of different machinery and implements such as tractor, combined harvestor and other implements to be difficult to use.

(iv) Topography of the farm. The farms which are found in mountainous area are very difficult to use different implements and machinery. This cause farmers to use simple tools such as hand hoe.

(b) Propose four strategies that can be used to improve adoption of agricultural mechanization in Tanzania.

(i) Provision of education on how to use implements and tools in Agricultural process. The provision of education to farmers will help them to know how to use these implements and machinery.

(ii) Financial support to small farmers. The different institution such as bank and volunteering organization should provide financial support to the farmers to enable them to buy and use different machinery.

(iii) Expansion of farms. The expansion of the farms will lead to the use of larger machinery and implements such as tractor.

(iv) The government should providing loans to small farmers. The government should providing support such as loans to small farmers to enable them to use and buy different implement.

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

Extract 3.1 exemplifies responses from the student who attempted well all parts of the question. This shows that, the student was knowledgeable on the subject matter.

Moreover, 31.50 per cent of the students had an average performance in the question. Most of them provided partial correct responses in both parts of the question. In part (a), the students were unable to exhaust all the factors causing low adoption of agricultural mechanization. Likewise, in part (b) they failed to propose all the strategies that can be used to improve the adoption of agricultural mechanization. This suggests they had a partial understanding of the subject matter.

Unfortunately, 58.62 per cent of the students had a weak performance. Most of them responded incorrectly in both parts of the question. In part (a), the students were unable to suggest factors causing the low adoption of agricultural mechanization by the farmers in Tanzania. Most of them were affected by the word 'factors' and hence mentioned different factors such as factors of production, factors affecting crop production, factors influencing soil formation and factors to consider in selecting machines. This is evidence that the students lacked an understanding of the subject matter. Moreover, in part (b), the students failed to give the strategies used to improve the adoption of agricultural mechanization. The responses provided by the students mostly focused on measures to be taken to improve agricultural production. These include *use better seeds, irrigation, control pests and diseases, use manure, improve processing and storage* and *good prices*. Students' failure to meet the demand of the question was a result of a misunderstanding of the concept. Extract 3.2 is a sample of incorrect responses to the question.

5. Agricultural mechanization is one of the strategies to improve agricultural production in Tanzania. However, the farmers' adoption of agricultural mechanization is still low in most parts of the country due to various factors.

(a) Suggest four factors causing low adoption of agricultural mechanization by farmers in Tanzania.

(i) To the farm Agricultural mechanization it cause accident for your farmers farmers during the worker it cut a legs are hand it cause accident for the farm

(ii) Cause death; farmers during the worker to machine (eg) Tractor. So, tractor it let for death

(iii) It cause money.
Agricultural mechanization it cause money for the farmers of yo in Tanzania.

(iv) It cause employment opportunity.
Agricultural mechanization it cause employment opportunity to the farmer in Tanzania

(b) Propose four strategies that can be used to improve adoption of agricultural mechanization in Tanzania.

(i) It save time
Agricultural mechanization it save time to the farm.

(ii) Sauce of provision of food
Agricultural mechanization it help for sauce of provision of food to the life of human being to the society.

(iii) provide money
Agricultural mechanization it help for provide money to the life of human being.

(iv) Provide employment opportunity.
Agricultural mechanization it help for employment opportunity for the agriculture farm.

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

Extract 3.2 represents a sample of incorrect responses from a student who lacked knowledge of the subject matter. Most of the responses provided by the student in both parts of the question explained the importance of mechanization.

2.2.2 Question 6: Principles of Crop Production

The question had parts (a) and (b) carrying a total of 10 marks. The students were required to: (a) describe five importance of drainage in controlling the problem of water logging in the agricultural fields and (b) briefly explain how the following drainage structures work: (i) open ditches (ii) cut-off ditches. The question tested the students' knowledge of the concept of drainage.

The question was attempted by 27,030 (100%) students whereby 23,903 (88.43%) scored from 0.0 to 2.5 marks, 2,842 (10.51%) from 3.0 to 6.0 marks and 285 (1.06%) from 6.5 to 9.5 marks. Figure 6 indicates the students' scores on the question.

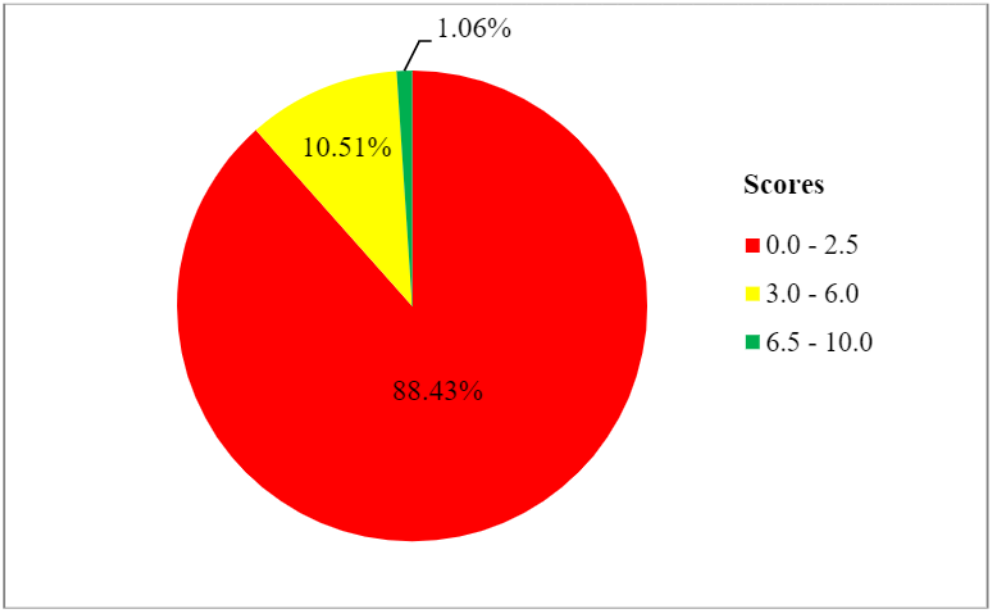
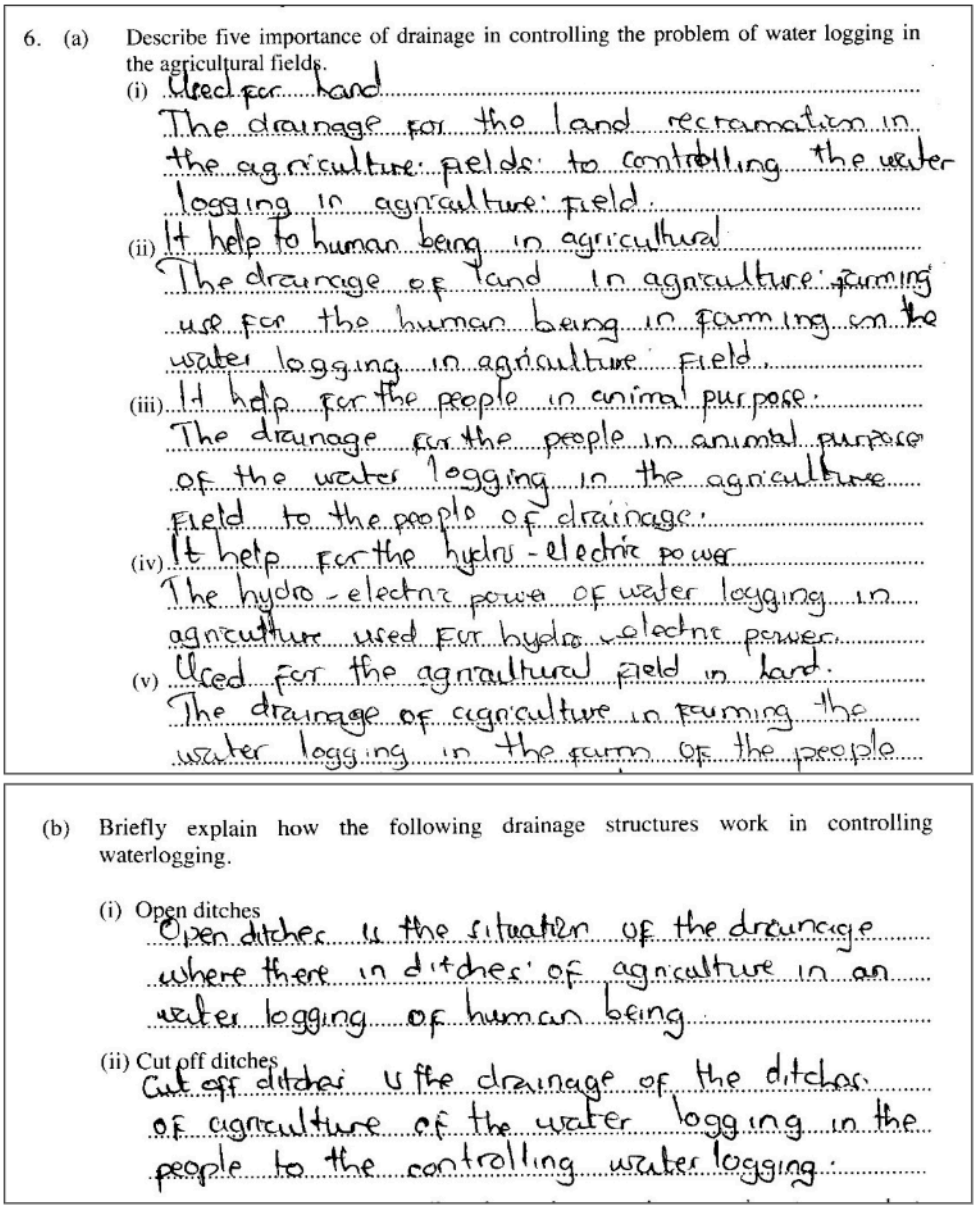


Figure 6: *Students' performance on Question 6*

Figure 6 indicates that 88.43 per cent of the students scored from 0.0 to 2.5 marks while 11.57 per cent from 3.0 to 9.5 marks indicating weak performance.

The students who did poorly in the question were 88.43 per cent. The majority attempted incorrectly almost all parts of the question. In part (a), the students failed to describe the importance of drainage in controlling the problem of water logging in the agricultural fields. Some of the students provided the importance of water such as *used in fishing, used in domestic activities like cooking, used in transportation/ navigation, used for irrigation* and *used for recreational activities*. Others gave a variety of incorrect responses like *help to control the growth of weed, help to prevent pest and disease, help to control soil erosion, help to increase soil operations and help to conserve soil structure*. The nature of the responses given points to the fact that the students did not understand what drainage is as far as agriculture is concerned.

In the same way, in part (b) the students failed to explain the named drainage structures by giving a variety of incorrect responses such as (i) open ditches; *is the type of water logging in the work in agricultural science*, *is used for cutting grain wood, is the open ditches for waterlogging, it help to drainage of water logging in the farm, is involved to open structure work and used in the drainage structure* and (ii) cut off ditches; *is used in drainage structure to cut off ditches, it is used for cutting grain wood, is used for growing cutting along the grain of the wood, it helps to irrigate water, is the cut-off ditches for waterlogging, it involves the cut chemicals of the ditches and cutting and slashing of vegetative materials*. All these responses indicate the students were not familiar with the drainage structures and how they work. Extract 4.1 is a sample of incorrect responses to the question.



6. (a) Describe five importance of drainage in controlling the problem of water logging in the agricultural fields.

(i) Used for land
The drainage for the land reclamation in the agriculture fields to controlling the water logging in agriculture field.

(ii) It help to human being in agricultural
The drainage of land in agriculture farming use for the human being in farming on the water logging in agriculture field.

(iii) It help for the people in animal purpose.
The drainage for the people in animal purpose of the water logging in the agriculture field to the people of drainage.

(iv) It help for the hydro-electric power
The hydro-electric power of water logging in agriculture used for hydro-electric power.

(v) Used for the agricultural field in land.
The drainage of agriculture in farming the water logging in the farm of the people

(b) Briefly explain how the following drainage structures work in controlling waterlogging.

(i) Open ditches
Open ditches is the situation of the drainage where there in ditches of agriculture in an water logging of human being

(ii) Cut off ditches
Cut off ditches is the drainage of the ditches of agriculture of the water logging in the people to the controlling water logging.

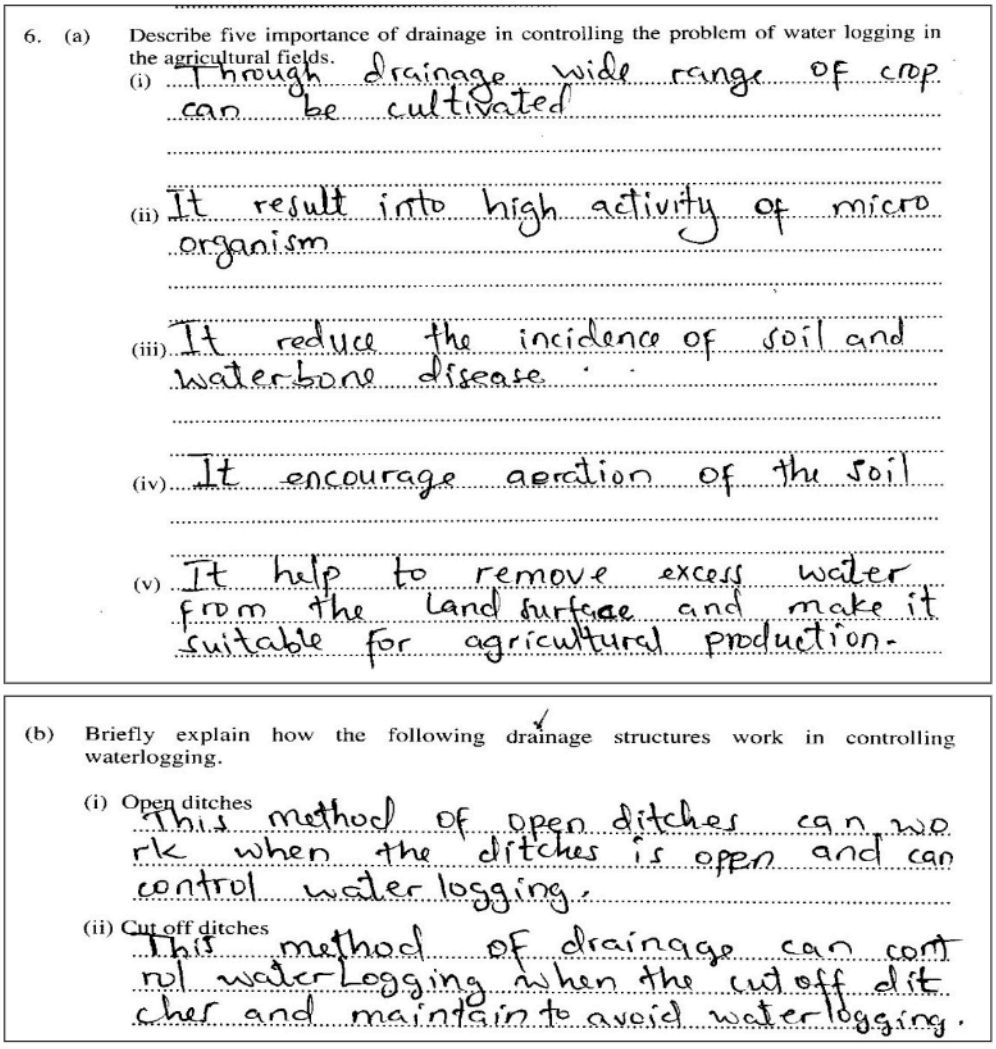
Extract 4.1: *A sample of the student's incorrect responses to Question 6*

Extract 4.1 presents a sample of incorrect responses from a student who lacked knowledge of the subject matter. The student provided incorrect responses in both parts of the question using poor English language.

The students who had average performance account 10.51 per cent. In part (a), the majority were able to describe the importance of drainage in controlling waterlogging thus signifying competence on the subject matter.

In part (b), the students failed to explain how the named drainage structures work. This shows that they were not conversant with the working of these structures

Nevertheless, 1.06 per cent of the students did well in the question. Majority attempted correctly in almost all parts of the question. In part (a), the students were able to describe the importance of drainage in controlling the problem of water logging in the agricultural fields. Examples of correct responses provided were; *a wide range of crops can be cultivated in the soil with optimum amount of water, removal of excess water encourages soil aeration, good aeration and optimum temperature due to removal of excess soil water encourage activities of soil microorganism which decompose organic materials, reducing incidences of soil and water-borne diseases, a well-drained land is easily mechanized and land available for crop production increases*. These correct responses signify that students had sufficient knowledge of importance of the drainage. Likewise, in part (b) the students managed to explain how the named drainage structures work. For example, (i) open ditches; *are narrow channels dug for drainage and or irrigation. They allow surplus water to flow away down ditches and lower the water table sufficiently to enable crops to be grown* (ii) cut off ditches; *these are drainage structures which take away surplus water from the spring line or hill side so that the area will not receive surplus water from springs or hill side. This drains water from the farm before it causes damage in the form of erosion.* The students' responses indicate that they were knowledgeable and skilled on the working of drainage structures. Extract 4.2 is an example of correct responses to the question



6. (a) Describe five importance of drainage in controlling the problem of water logging in the agricultural fields.

(i) Through drainage wide range of crop can be cultivated

(ii) It result into high activity of micro organism

(iii) It reduce the incidence of soil and waterbone disease.

(iv) It encourage aeration of the soil

(v) It help to remove excess water from the land surface and make it suitable for agricultural production.

(b) Briefly explain how the following drainage structures work in controlling waterlogging.

(i) Open ditches
This method of open ditches can work when the ditches is open and can control water logging.

(ii) Cut off ditches
This method of drainage can control waterLogging when the cut off ditcher and maintain to avoid waterlogging.

Extract 4.2 *A sample of the student's correct responses to Question 6*

Extract 4.2 indicates responses from the student who attempted well in almost all parts except in part (b) where he/she provided partially correct responses.

2.2.3 Question 7: Principles of Crop Production

The question consisted of parts (a) and (b) carrying a total of 10 marks. Students were required to: (a) justify by giving three reasons why weeds can survive and adapt well to the environment in comparison to crop plants and (b) briefly explain by giving five points why most farmers use cultural practices to control weeds. The question assessed the students' understanding of the concept of weeds.

The question was attempted by 27,030 (100%) students out of which 23,506 (86.96%) scored from 0.0 to 2.5 marks, 1,649 (6.10%) from 3.0 to 6.0 marks and 1,875 (6.94%) from 6.5 to 10 marks. Figure 7 summarises the students' scores on the question.

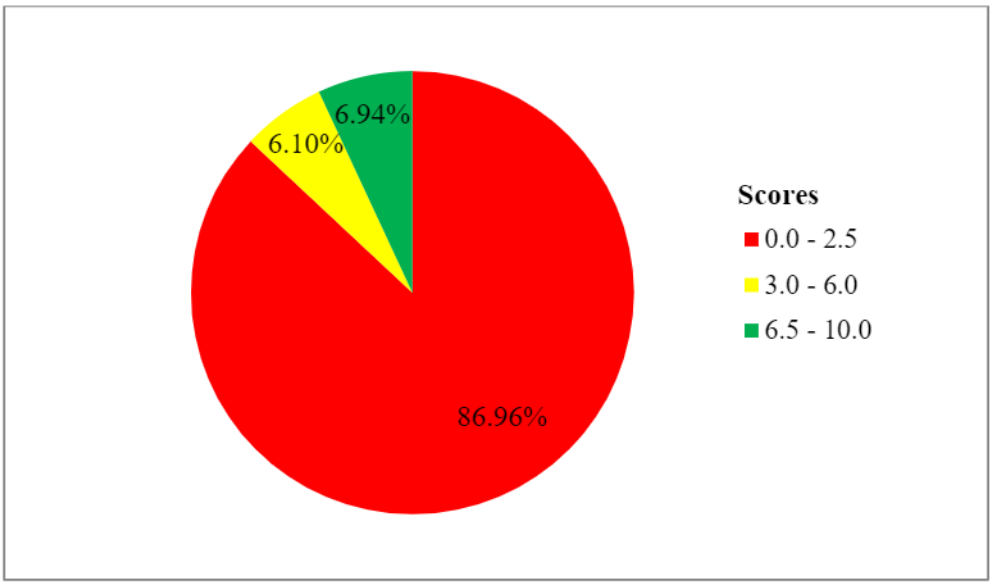
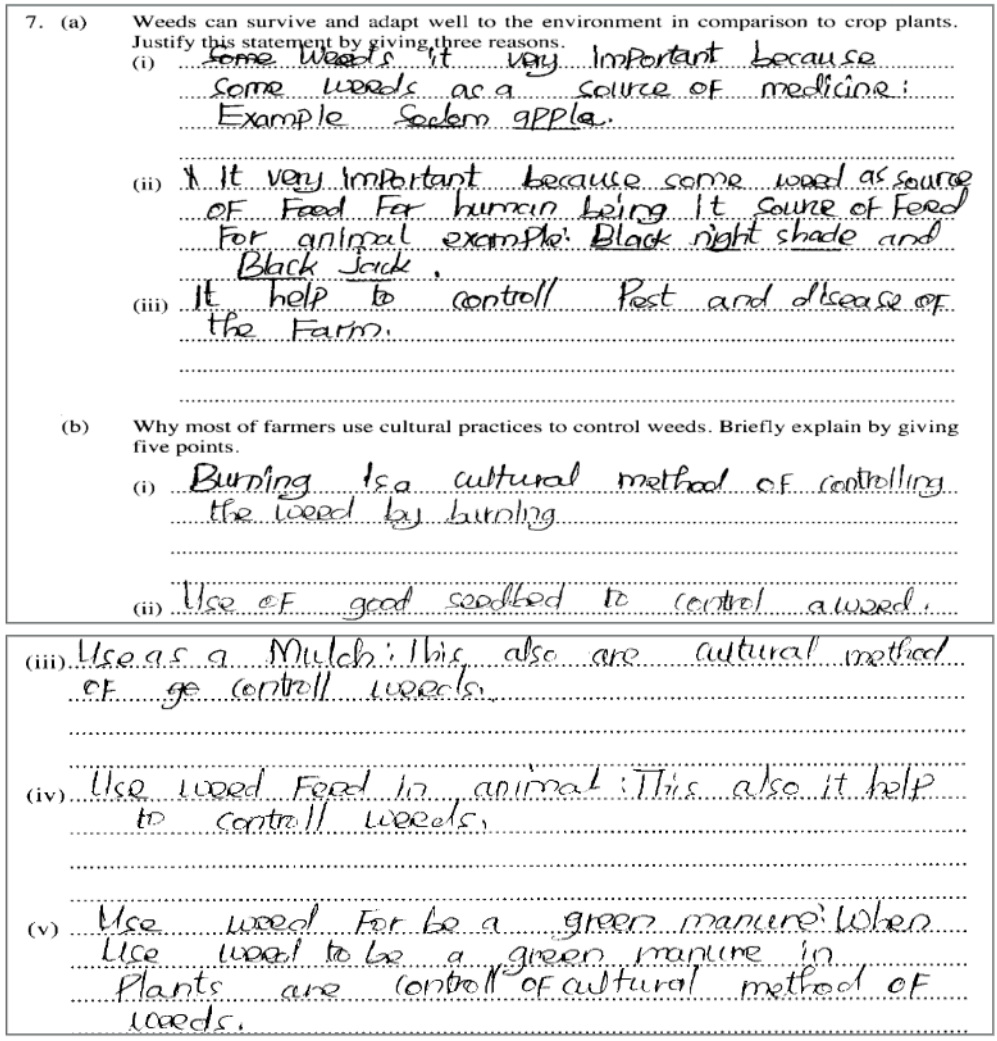


Figure 7: *Students' performance on Question 7*

In view of Figure 7, 86.96 per cent of the students scored from 0.0 to 2.5 marks whereas 13.04 per cent from 3.0 to 10 marks. The performance in the question was weak.

Data further indicate that 86.96 per cent of the students had a weak performance. Most of them failed to provide correct responses in both parts of the question. In part (a), they were unable to justify why weeds can survive and adapt well to the environment in comparison to crop plants. Some of the students provided the importance of weeds instead of fulfilling the demand of the question. Examples of incorrect responses provided were *help in moisture and water conservation, help to prevent soil erosion, increase soil fertility, cover the soil, it is a source of food and used as medicine*. In some cases the students mentioned different types of weeds and the crops they invade and affect. For example, *wild finger millet affecting finger millet, coach grass affecting maize, black jack affecting cassava* and *striga affecting paddy*. This suggests that the students did not understand the concept of adaptations of weeds. In part (b), the students failed to give reasons why most farmers use cultural practices in controlling weeds. Some

of the incorrect responses provided were the cultural methods used to control weeds like the *use of weeds resistant crop varieties, burning, flooding* and *mulching.* Others explained the general methods of controlling weeds such as the legislative method, chemical method, mechanical method, biological method and cultural method. This proves that the students were incompetent in the advantages of weed control methods. Extract 5.1 is a sample of incorrect responses to the question.



7. (a) Weeds can survive and adapt well to the environment in comparison to crop plants. Justify this statement by giving three reasons.

(i) Some Weeds it very Important because some weeds as a source of medicine: Example Sodom apple.

(ii) It very Important because some weed as source of Food For human being It Soure of Feed For animal example: Black night shade and Black Jack.

(iii) It help to controll Pest and disease of the Farm.

(b) Why most of farmers use cultural practices to control weeds. Briefly explain by giving five points.

(i) Burning is a cultural method of controlling the weed by burning

(ii) Use of good seedbed to control a weed.

(iii) Use as a Mulch: This also are cultural method of ge controll weeds.

(iv) Use weed Feed in animal: This also it help to controll weeds.

(v) Use weed For be a green manure: When Use weed to be a green manure in Plants are controll of cultural method of weeds.

Extract 5.1: *A sample of the student's incorrect responses to Question 7*

Extract 5.1 exemplifies a sample of responses from the students who lacked subject matter knowledge. In part (a), the student gave importance to weeds whereas in part (b) he/she provided cultural control methods contrary to the demand of the question.

Furthermore, 6.10 per cent of the students had an average performance. The majority managed to give reasons why most of the farmers use cultural practices in controlling weeds in part (b). This shows the students had good mastery of knowledge on the weed control methods. However, most of them failed to justify why weeds can survive and adapt well to the environment in comparison to crop plants in part (a). The responses provided were the general adaptations of plants and were not specific to weeds. This is an indication that they were not familiar with the adaptations of weeds to their environment.

On the contrary, 6.94 per cent of the students had a good performance. The majority provided correct responses in all parts of the question. In part (a), they managed to justify why weeds can survive and adapt well to the environment in comparison to crop plants. Examples of such correct responses include; *weeds have extensive root system useful in supporting the plant in nutrient absorption and water uptake, weeds have the ability to survive where there is limited nutrient supply, weeds have a short life cycle that is; if the rain regime is restricted the plant can complete its life cycle, weeds can produce large quantities of seeds, weeds seeds can remain viable in the soil and water for a long time waiting for conducive germination conditions, most weeds can be easily and successfully dispersed by water, wind and animals among other agents, some weeds can reproduce both sexually (by seeds) and asexually (by vegetative structure).* Furthermore, in part (b) students managed to give reasons why most farmers use cultural practices in controlling weeds. Such correct responses were; *easy to practice, effective for small areas, good for farmers with low knowledge of modern methods of controlling weeds, economically feasible, environmentally friendly and maintain purity and or quality and market price of harvested grain*. The responses provided justify the possession of adequate subject matter knowledge. Extract 5.2 is an example of correct responses to the question.

7. (a) Weeds can survive and adapt well to the environment in comparison to crop plants. Justify this statement by giving three reasons.

(i) weeds can reproduce by both sexual (by seeds) and asexual means (vegetative parts) as a result they adopt well the environment in comparison to crop plants.

(ii) weed they produce high amount of seeds which results to them to grow at high amount.

(iii) weeds are light feeders and highly competitive in nutrient uptake.

(b) Why most of farmers use cultural practices to control weeds. Briefly explain by giving five points.

(i) It is easy to perform. this is because it require simple skills in performing it.

(ii) It is less costlyfully since it require people and mechanical tools such as hand hoes to perform it

(iii) It is safe compared to the use of herbisides which are poisons which may harm the human health when come into contact with the body.

(iv) It is not selective to the plants compared to herbisides which also kills the not requrred crops or it is suitable for mono cropping system.

(v) It is easy to operate since it requires simple knowledge to perform it and operate comperate to other methods.

Extract 5.2: *A sample of the student's correct responses to Question 7*

Extract 5.2 shows responses from a student who attempted well in all parts of the question. This signifies that the student was knowledgeable about the concept of weeds and weeds control.

2.2.4 Question 8: Basics of Farm Management

The question composed of parts (a) and (b) carrying a total of 10 marks. Students were required to: (a) account for five types of risks that might be faced during production processes and (b) give five factors which cause risks in the farming business. The question is intended to assess students' knowledge of the concept of risk.

The question was attempted by 27,030 (100%) students in which 13,594 (50.29%) scored from 0.0 to 2.5 marks, 11,844 (43.82%) from 3.0 to 6.0 marks and 1,592 (5.89%) from 6.5 to 10 marks. Figure 8 shows the students' scores on the question.

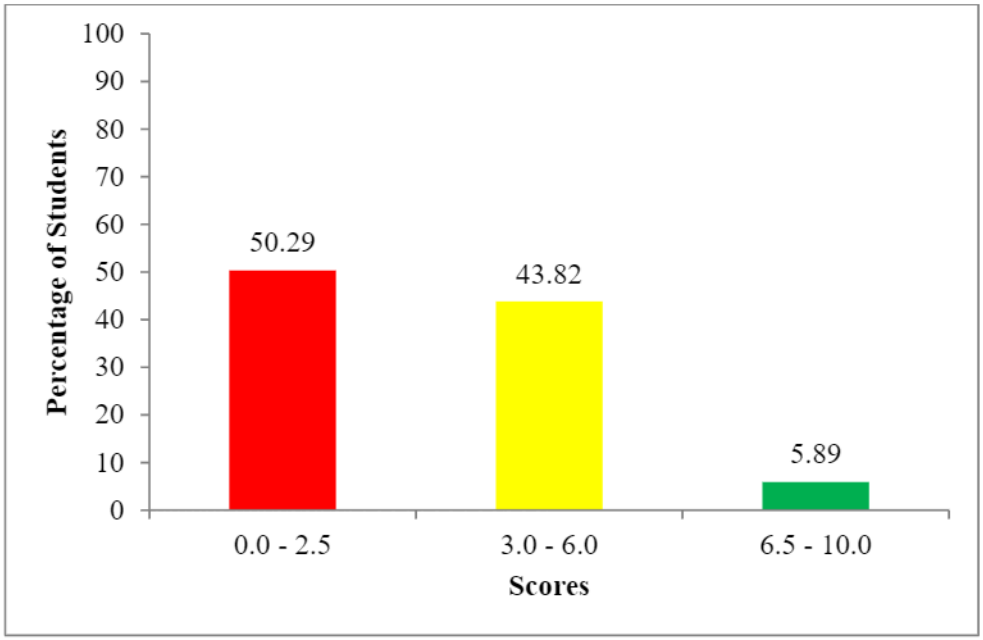


Figure 8: *Students' performance on Question 8*

Figure 8 indicates 49.71 per cent of the students scored from 3.0 to 10 marks while 50.29 per cent from 0.0 to 2.5 marks, the performance which was generally average.

Data analysis revealed that 5.89 per cent of the students had good performance. The majority of them responded correctly in nearly all parts of the question. The students managed to account for types of risks that might be faced during production processes in part (a).

Examples of such correct responses were*; production risks, market risks, institutional risks, personal risks* and *financial risks*. In part (b), the students gave correct responses on factors that cause risks. Such responses were; *the health of the farmers and other people on the farm, pests and diseases outbreaks on crops and livestock, weather hazards, theft and fire outbreaks.* The correct responses provided by students imply that they had sufficient knowledge of the subject matter. Extract 6.1 is an example of correct responses to the question.

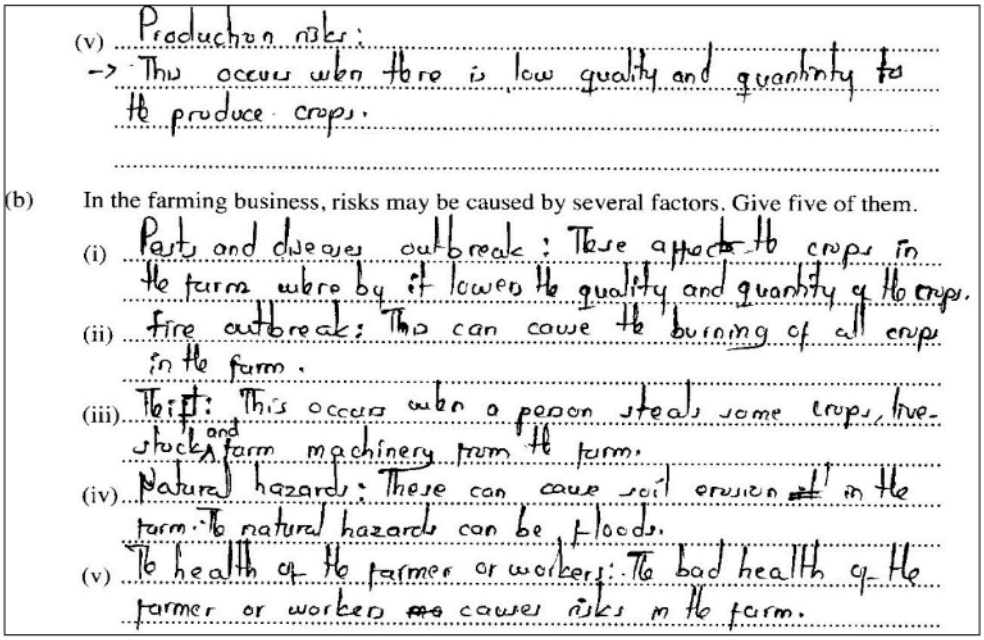
8. (a) Account for five types of risks that you might face during production processes.

(i) Financial risks
-> This comes when a farmer has failed to pay the debt to a person who looned him/her.

(ii) Institutional risks:
-> This occure when there is unpredictable changes in provision of services.

(iii) Personal/Human risks:
-> This includes illness, accidents or death of the farmer.

(iv) Marketing risks:
-> This occure when there is low prices at a certain period.



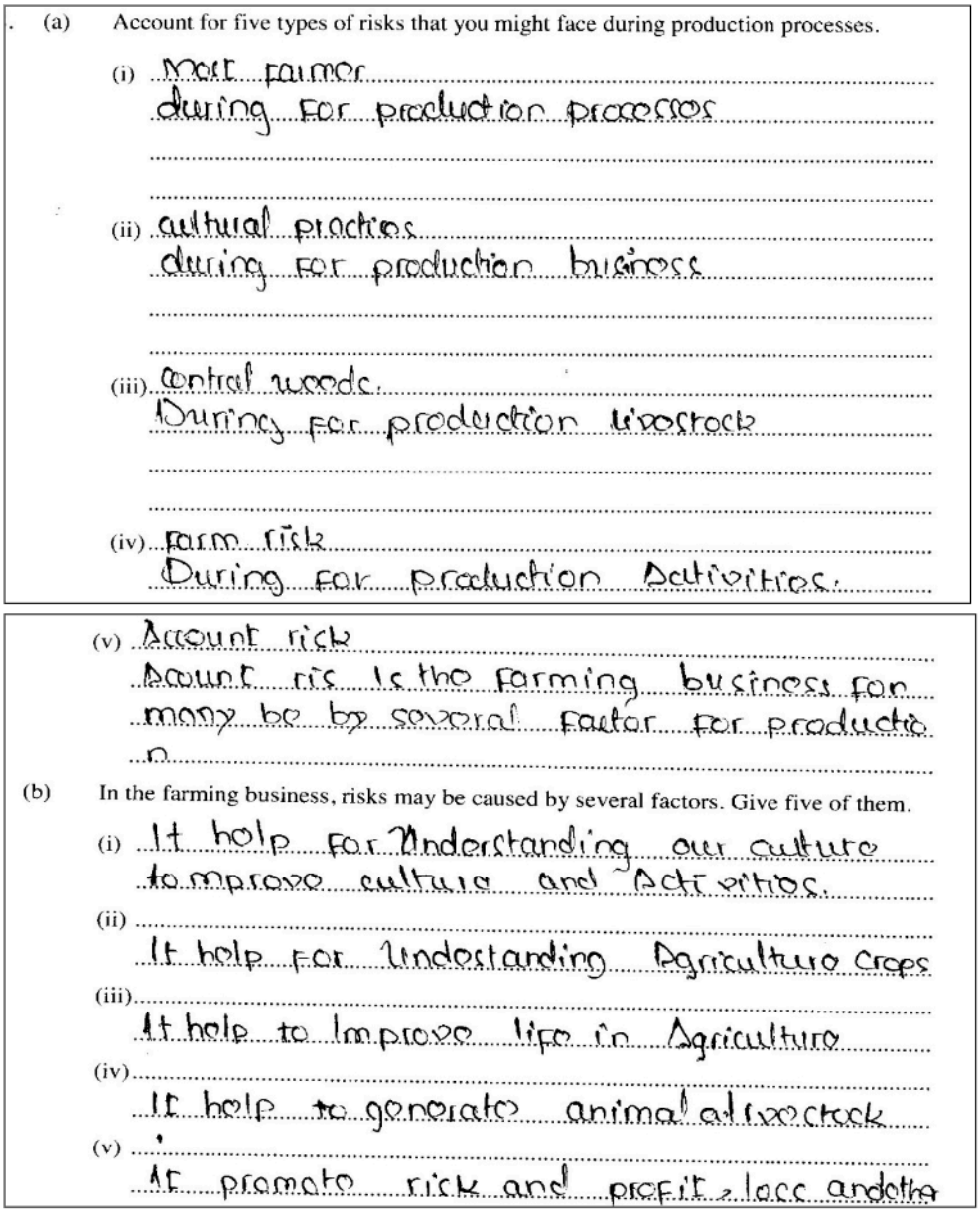
Extract 6.1: *A sample of the student's correct responses to Question 8*

Extract 6.1 exemplifies responses from the student who attempted well all parts of the question. This shows that the student had enough knowledge of the types and causes of risks during production.

Moreover, data depicts that 43.82 per cent of the students had an average performance. The students were unable to exhaust all the correct responses in both parts of the question. In part (a), some students mentioned the points without explaining them. Others presented types of uncertainties instead of types of risks as demanded. Similarly, the students mentioned the factors that cause risks in part (b) without giving detailed information. The students' responses demonstrate that they had partial knowledge of the subject matter.

On the other hand, 50.29 per cent of the students had a weak performance. The majority had poor performance in almost all parts of the question. In part (a), the majority failed to account for the types of risks that might be faced during production processes. Some of the incorrect responses provided were; *enterprise risks, farm risks, social risks, land risks, economic risks* and *environmental risks*. Other students mixed up the causes of risks in part (b) to be the type of risks and came up with incorrect responses such as the *health of the farmer, pests and diseases outbreak on crops and livestock, theft, weather hazards and fire outbreaks*.

The responses provided by the students point to the fact that some lacked understanding of the concept and others had misconceptions. In part (b), the students were unable to give factors that cause risks in production. Most of the responses provided by the students were for the factors that affect agricultural production including *economic factors, environmental factors, edaphic factors, institutional factors* and *social factors*. The students in this case demonstrated poor mastery of the subject matter. Extract 6.2 is a sample of incorrect responses to the question.



Extract 6.2 *A sample of the student's incorrect responses to Question 8*

Extract 6.2 illustrates a sample of incorrect responses from a student who lacked knowledge of the subject matter. The student wrote things that were not related to the demand of the question.

2.2.5 Question 9: Introduction to Crop Production

The question carried 10 marks. The question required students to recommend four principles of carrying out crop rotation in farming. The question tested the students' knowledge and skills of crop rotation.

The question was attempted by 27,030 (100%) students where 15,757 (58.29%) scored from 0.0 to 2.5 marks, 8,453 (31.27%) from 3.0 to 6.0 marks and 2,820 (10.44%) from 6.5 to 10 marks. Figure 9 presents the students' scores on the question.

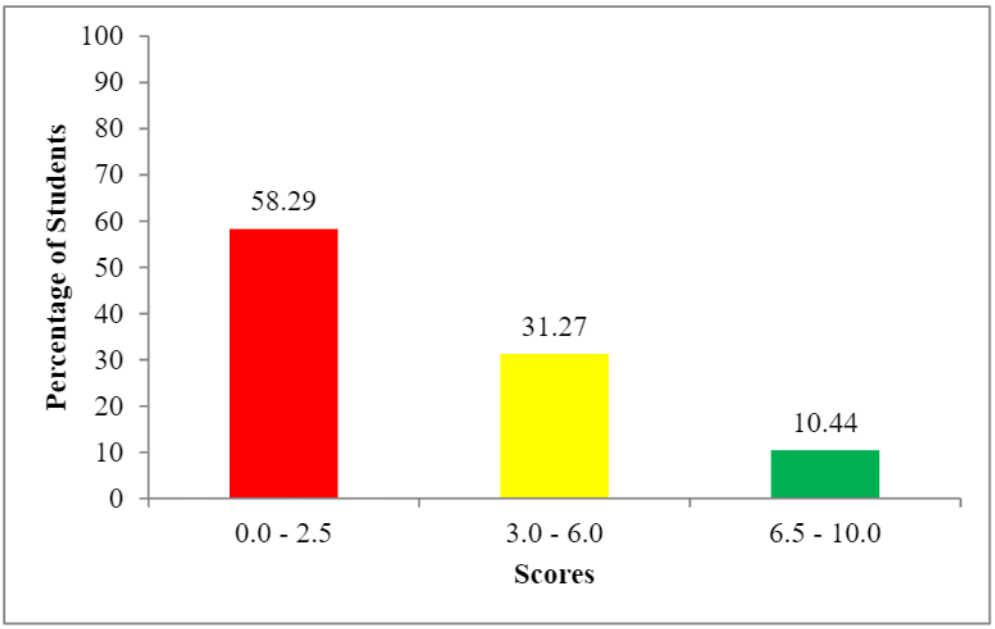
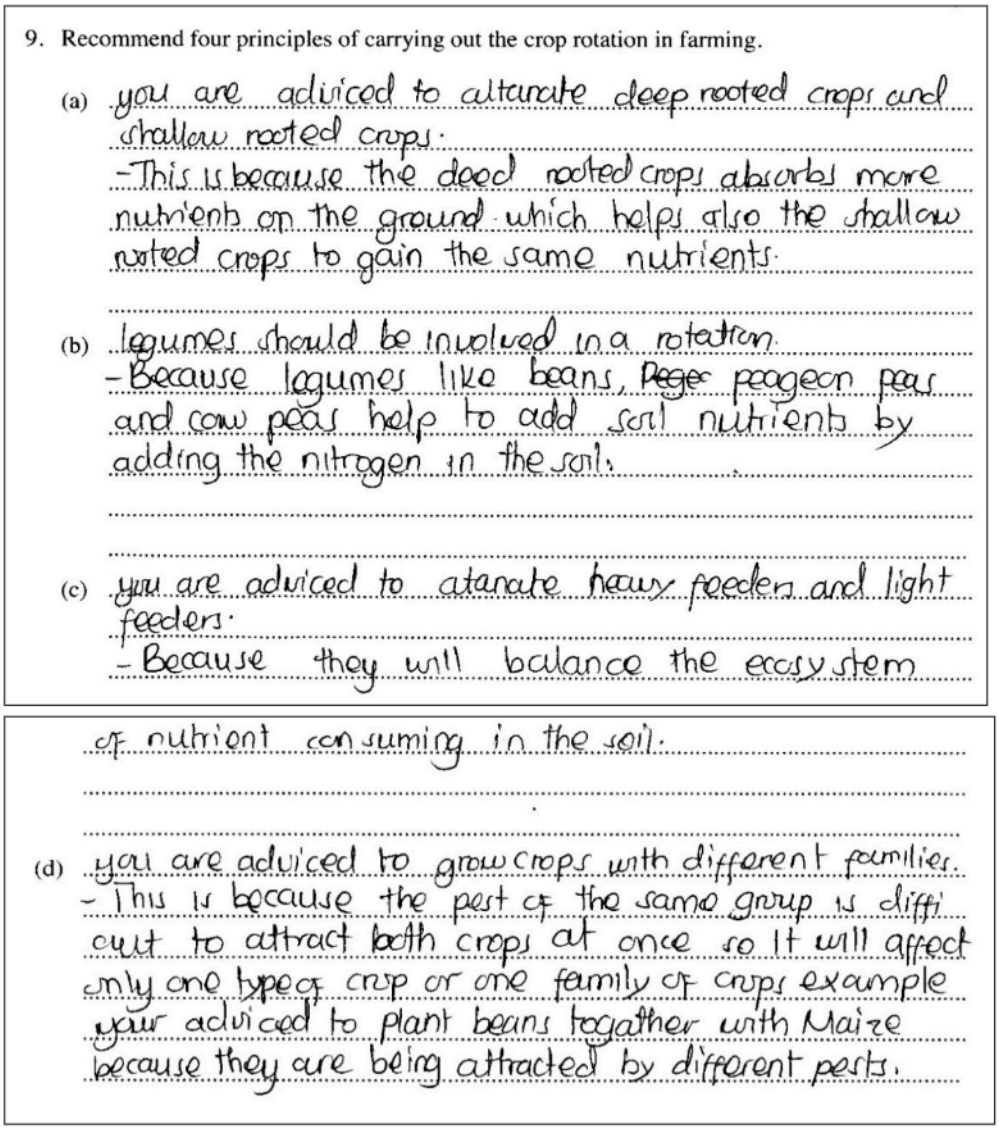


Figure 9: *Students' performance on Question 9*

Referring to Figure 9, 41.71 per cent of the students scored from 3.0 to 10 marks and 58.29 per cent from 0.0 to 2.5 marks. The general performance in the question was average.

Further analysis shows that 10.44 per cent of the students had a good performance. The majority were able to recommend the principles of crop rotation. Examples of the responses given were; *heavy feeder plants should follow light feeder in a rotation to ensure balanced utilisation of nutrients*

from the soil, legumes should be included in a rotation to fix atmospheric nitrogen and change into nitrate by the bacteria that live in the root nodules, plant crops of different families in succession year or season to minimise the number of pests that may attack the crop plants of the same family, deep rooted plants should follow a shallow rooted plants in a rotation to allow nutrients from all depths to be utilised by the plants and interchange crops which have different growing habits to cover the soil fully and thus suppress weeds. These correct responses given by the students indicate a good understanding of the principles of crop rotation. Extract 7.1 is an example of correct responses to the question.



9. Recommend four principles of carrying out the crop rotation in farming.

(a) you are adviced to altarnate deep rooted crops and shallow rooted crops.
-This is because the deed rooted crops absorbs more nutrients on the ground which helps also the shallow rooted crops to gain the same nutrients.

(b) legumes should be involved in a rotation.
-Because legumes like beans, Peger peageon peas and cow peas help to add soil nutrients by adding the nitrogen in the soil.

(c) you are adviced to atanate heavy feeders and light feeders.
- Because they will balance the ecosystem of nutrient consuming in the soil.

(d) you are adviced to grow crops with different families.
- This is because the pest of the same group is diffi cult to attract both crops at once so it will affect only one type of crop or one family of crops example your adviced to plant beans togather with Maize because they are being attracted by different pests.

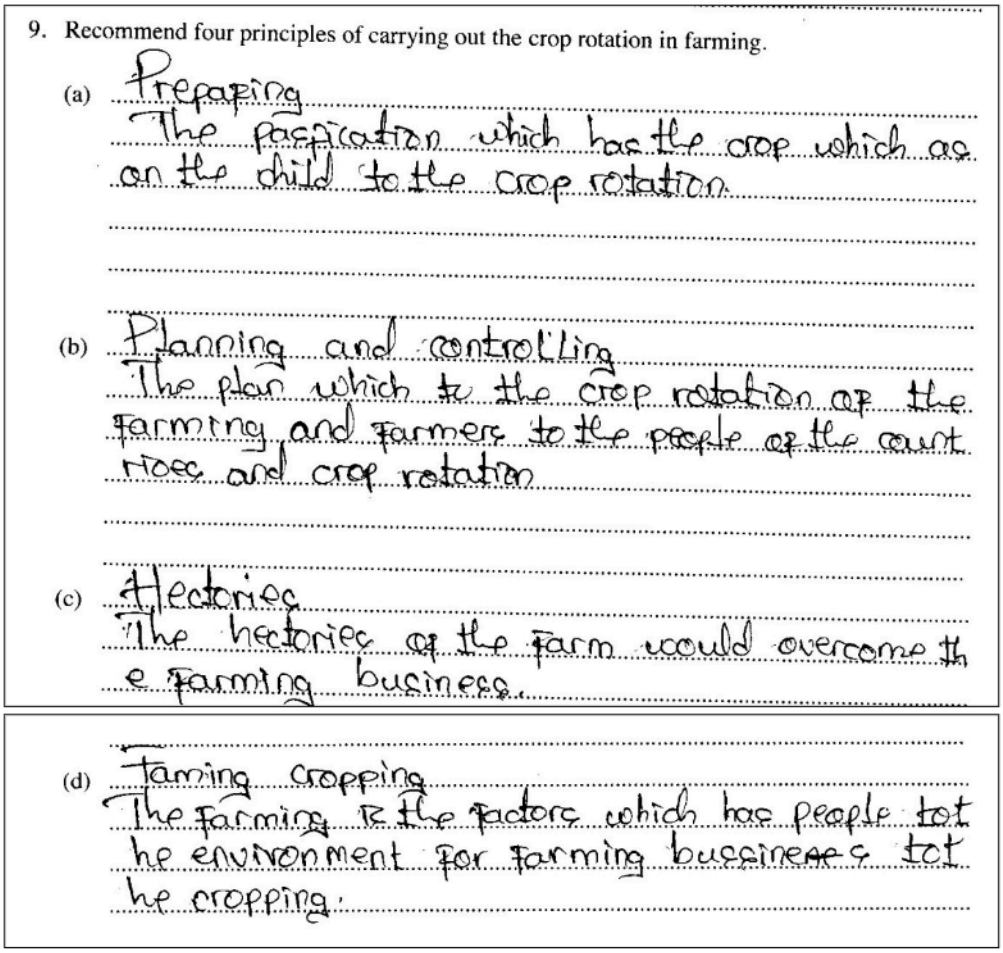
Extract 7.1: *A sample of the student's correct responses to Question 9*

Extract 7.1 indicates responses from the student who attempted well the question. The student was knowledgeable about the principles of crop rotation.

About 31.27 percent of the students had an average performance and most of them only managed to state the principles without giving explanations. This resulted in not scoring full marks. The partial correct responses provided imply that the student had partial knowledge of the principles of crop rotation.

On the other hand, 58.29 per cent of the students had a weak performance. The students failed to recommend the principles of crop rotation. Some of the students provided principles of crop production instead of the principles of crop rotation like *planting, weeding, harvesting, storage of crops, pest and disease control and supply of moisture.* Others provided crop rotation programmes for 4 years for example:
Year 1; *plant maize crop,*
Year 2; plant sorghum,
Year 3, grow sunflower
Year 4, fallow the land.

These responses indicate that students were unfamiliar with the principles of crop rotation. Extract 7.2 is a sample of incorrect responses to the question.


9. Recommend four principles of carrying out the crop rotation in farming.

(a) Preparing
The pacification which has the crop which as on the child to the crop rotation.

(b) Planning and controlling
The plan which is the crop rotation of the farming and farmers to the people of the count ries and crop rotation

(c) Hectories
The hectories of the farm would overcome th e farming business.

(d) Faming cropping
The farming is the factors which has people tot he environment for farming bussineas tot he cropping.

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

Extract 7.2 represents a sample of incorrect responses from a student who lacked knowledge of the subject matter. The student wrote things that were not related to the assessment.

2.3 SECTION C: ESSAY QUESTION

2.3.1 Question 10: Basics of Farm Management

The question carried a total of 15 marks. The students were required to suggest using six points how farmers would overcome the risks and uncertainties in the farming business. The question tested students' knowledge of risks and uncertainties in the farming business.

The question was attempted by 27,030 (100%) students of which 17,262 (63.86%) scored from 0.0 to 4.0 marks, 8,014 (29.65%) from 4.5 to 9.5 marks and 1,754 (6.49%) from 10 to 15 marks. Figure 10 indicates students' scores on the question.

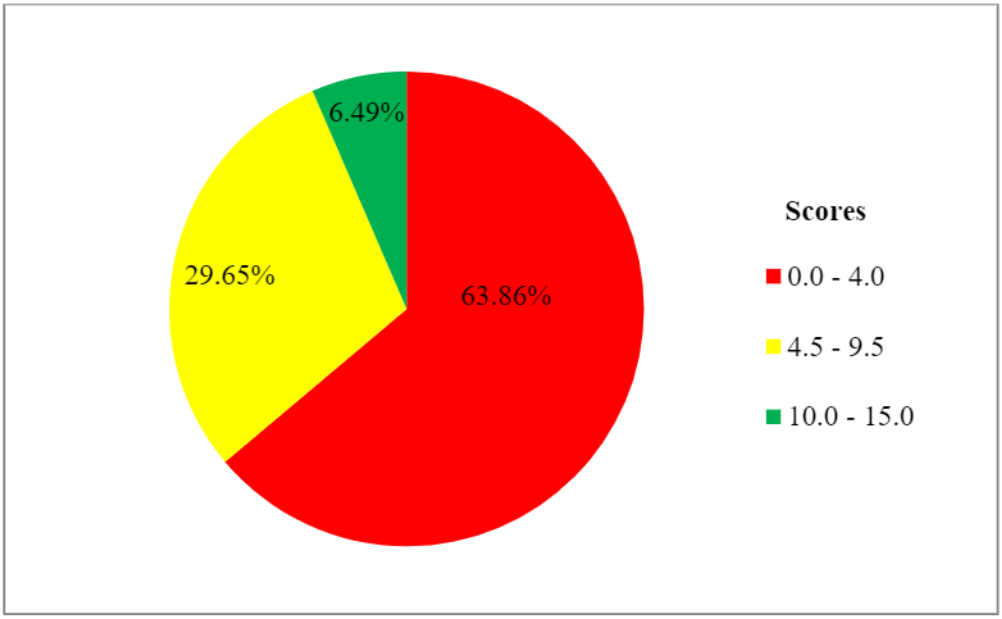


Figure 10: *Students' performance on Question 10*

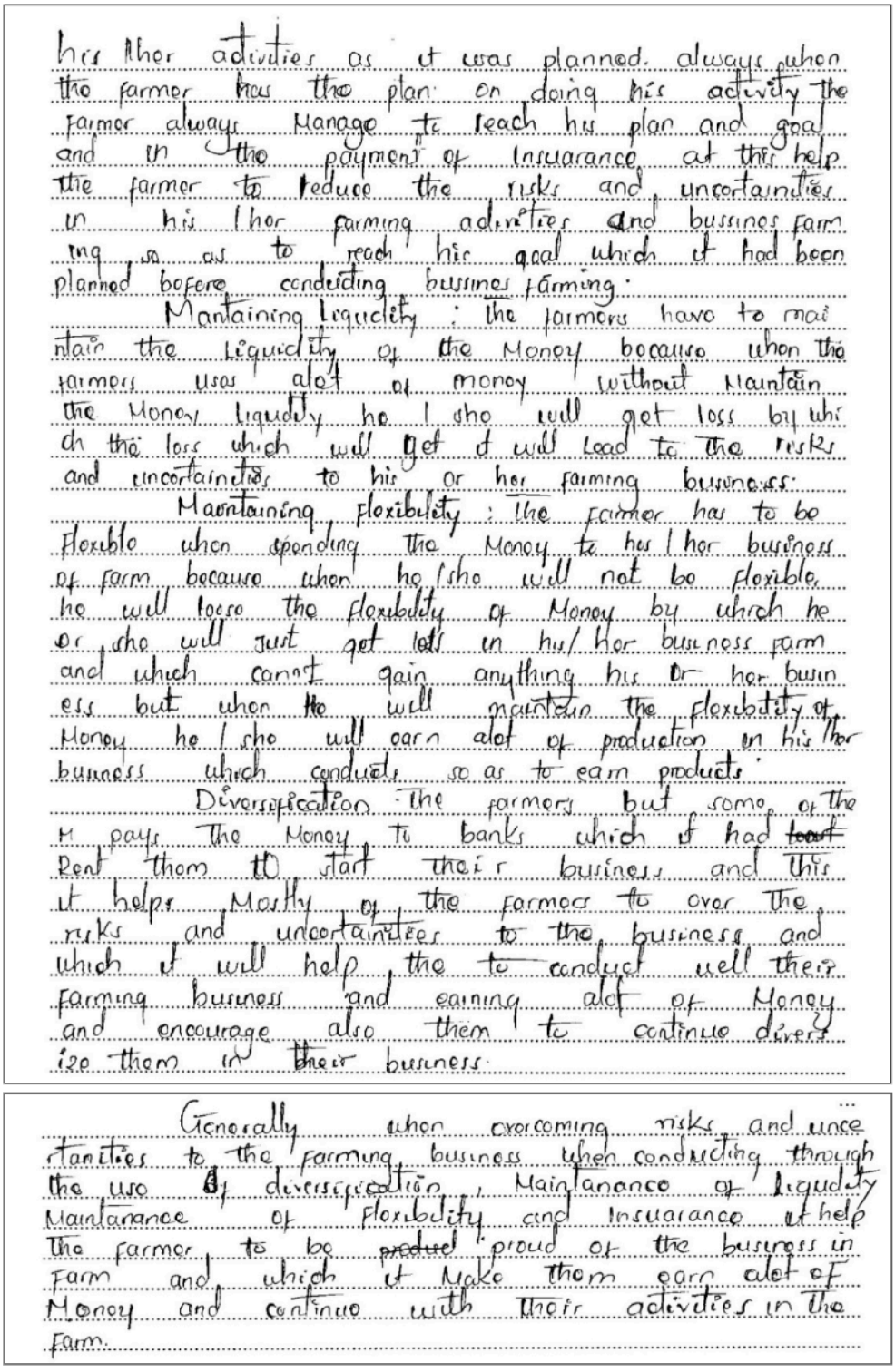
As per Figure 10, 36.14 per cent of the students scored from 4.5 to 15 marks whereas 63.86 per cent from 0.0 to 4.0 marks. Overall, students' performance in the question was average.

Further, data show that 6.49 per cent of the students had good performances. Most of them managed to suggest ways of overcoming risks and uncertainties in the farming business. Examples of such correct responses provided by the students include *diversification, input rationing, flexibility in production plans/methods, insurance, maintaining liquidity, production on a contract basis, provision of market information, selection of more reliable enterprises, partial processing and spreading crops and livestock sales.* These correct responses indicate that students were competent in ways to overcome risks and uncertainties. Additionally, analysis of responses shows that the students had good essay writing and organization skills. They organized it into introduction, main body and conclusion parts hence scoring high marks. Extract 8.1 is an example of correct responses to the question.

10. Using six points, suggest how farmers would overcome the risk and uncertainties in the farming business.

Risks the are the thing which are been conducted and be done so as to avoid the attack or destroyment of something but it might be in production activates : Risks it has several types which are production risks, Market risks, personal risks , financial risks and Institutional risks : in risks also their is some of factors which can causes: risks and uncertainties in farming business which are Fire hazard, Theft, Woather condition , personal health and Affect of pests and diseases . The following are the ways use to overcome risks ~~in farming~~ and uncertainties in performing farming business.

Insuarance: some of the farmers pay Money to the Insuarance bank so as maintain the price of their Money by which when the Farmer pay the Money in the banks of Insuarance. Insuarance bank help the in some of activities by which they will help a farmer to



her /her activities as it was planned. always when the farmer has the plan on doing his activity the farmer always manage to reach his plan and goal and in the payment of Insuarance at this help the farmer to reduce the risks and uncertainties in his /her farming activities and bussines farming so as to reach his goal which it had been planned bofere conducting bussines farming.

Mantaining liquclity : the farmers have to maintain the liquclity of the Money because when the farmers uses alot of money without Maintain the Money liquddy he / she will get loss by which the loss which will get it will Lead to the risks and uncertainties to his or her farming businoss.

Maintaining flexibility : the farmer has to be flexible when spending the Money to his / her business of farm because when he / she will not be flexible he will loose the flexibuity of Money by which he or she will just get lott in his / her business farm and which cannot gain anything his or her business but when he will maintain the flexibility of Money he / she will earn alot of production in his /her business which conducts so as to earn products.

Diversification : the farmers but some of the M pays the Money to banks which it had ~~loan~~ Rent them to start their business and this it helps Mostly of the farmers to over the risks and uncertainties to the business and which it will help the to conduct well their farming business and earning alot of Money and encourage also them to continue diversi ize them in their business.

Generally when overcoming risks and uncertainties to the farming business when conducting through the use of diversification, Maintanance of liquddy Maintanance of flexibility and Insuarance it help the farmer to be ~~produd~~ proud of the business in Farm and which it Make them earn alot of Money and continue with their activities in the farm.

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

Extract 8.1 typifies responses from the student who attempted well the question. This shows that the student was knowledgeable about the ways to overcome risks and uncertainties.

Students who performed on average were 29.65 per cent. Largely, they managed to give ways of overcoming risks and uncertainties but failed to explain them precisely. Others did not exhaust all the points though they explained them well. Partial correct responses provided are a sign of possession of partial knowledge of the subject matter by the students. Moreover, the students had good organization of their essays except that they did not know what should be included in the introduction and conclusion parts.

Nevertheless, 63.86 per cent of the students had a weak performance. They failed to suggest ways of overcoming risks and uncertainties in the farming business. Some of the incorrect responses provided were; *controlling pests and diseases to avoid risk in farm business*, *theft*, *should give a good technique or making walls to control theft in farm business*, *to get other ways in weathers such as irrigation scheme*, *the government should not change over time*, *finding market*, *store crops in good place*, *decision making in the farming and self-technique of overcoming risks and uncertainty in production*. The nature of the responses given indicates the students had a poor understanding of the ways of overcoming risks and uncertainties.

On the other side, most of the students demonstrated poor essay organizational skills. They failed to arrange their essays into the introduction, main body and conclusion parts. Extract 8.2 is a sample of the incorrect responses to the question.

10. Using six points, suggest how farmers would overcome the risk and uncertainties in the farming business.

Farming business: Is the business of people to farm in agriculture and to ~~co~~ crop of business.

The following are types of risk in overcome the risk and uncertainties in farming business.

Production risk: The risk in farming business are crop and the b agriculture farm in farming business to the crop of production risk in farm of the agriculture in the business. the farming business is the business of people to farm in agriculture and to crop of business.

Marketing risk: marketing risk in agriculture farm of people to the market: them people for crop in business: or the farming in agriculture and ~~the~~ the crop from marketing go to the market and the agriculture on farming in the crop production.

Institutional risk: The agriculture in farming and the crop of business is used for people to use them the agriculture farming in crop production and the business of crop in farming at the risk in institutional risk.

Human risk: People to use the risk to overcom the uncertainties and the human risk in agriculture the ~~farmer~~ in on the business of crop production in the risk and the use of agriculture in the farming on the process of might ~~face~~ in crop production in business.

Financial risk: The risk in agriculture for the people ~~th~~ to the crop on business and the might face of agriculture in farm people was the financial risk on business and the farm in crop business.

Therefore: The Risk and uncertainties was the people to overcome the use of the might face in the agriculture farming.

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

Extract 8.2 shows a sample of incorrect responses from a student who lacked knowledge of the subject matter. The students tried to explain the types of risks instead of ways of overcoming risks and uncertainties.

3.0 THE ANALYSIS OF STUDENTS' PERFORMANCE IN EACH TOPIC

This section is concerned with the analysis of students' performance in each topic. A total of 9 topics were assessed in this year's national assessment in the subject. For multiple-choice questions, 75.94 percent of students had good performance on the topics of *Introduction to Agriculture, Principles of Crop Production, Introduction to Livestock Production, Introduction to Soil Science, Basics of Farm Management, Factors of Production, Introduction to Crop Production and Crop Husbandry.* The concepts that were assessed under the topics include Soil texture, Crop Rotation, Livestock Breeds, Soil Fertility, Planting, Soil Porosity, Pest Control Methods and Classification of Agricultural Crops. The good performance of the students is attributed to a good understanding of the concepts, the fact that caused the students to meet the demands of the questions.

The topics in which the students had average performance were; *Basics of Farm Management* (42.93%), *Introduction to Crop Production* (41.71%), *Mechanisation in Agriculture* (41.38%) *and Introduction to Livestock Production* (39.02%). The concepts tested from the topics included risks and uncertainties, principles of crop rotation, adoption of mechanization and nomadic pastoralism. Inadequate understanding of the concepts by the students resulted in the students not fulfilling the demands of the questions hence performing averagely.

Students had weak performance in the topics of *Introduction to Agriculture* (25.60%), *Crop Husbandry* (21.57%) *and Principles of Crop Production* (12.30%). The key concepts tested were agriculture, crop plant diseases, drainage, weeds and weed control. Students' lack of understanding and misunderstanding of the concepts contributed to their failure to meet the demands of the questions hence weak performance. The performance of the students in different topics is summarised in the Appendix.

4.0 CONCLUSION AND RECOMMENDATIONS

The section gives a general picture of the analysis and offers suggestions for improving the learning and teaching process and hence students' performance in future assessments.

4.1 Conclusion

The overall performance of the students in the 2023 Agriculture national assessment was generally average. The data showed an increase in students' performance in 2023 as compared to 2022 in terms of number of students scoring high grades. In 2023 there was an increase in the number of students who scored high grades (A, B and C) compared to those in 2022. However, the percentage of students who score low grades (D and F) remains high, 84.71 per cent in 2022 and 83.75 per cent in 2023, indicating an insignificant change in the performance.

Reflecting on item-wise analysis of students' responses, several factors have been identified to contribute to a majority of the students' scoring low marks and hence attaining low grades. The critical factors include students' lack of or inadequate understanding of the tested concepts, misunderstanding of the tested concepts and poor English language proficiency. It was clear that lack of understanding of the concepts used in the questions caused the students to provide incorrect responses. Moreover, the students sometimes failed to attempt the questions or wrote things that were not related to the assessment and consequently scored zero marks. An inadequate understanding of the concepts could be a reason for the students to provide partially correct responses that did not fulfill the demands of the questions. In this case, the students scored low marks. On the other hand, misunderstanding the concepts might have led the students to provide responses that were out of the demands of the questions.

It was evident in the analysis that most of the students who had weak performance had difficulties in English language command. The students failed to write meaningful and understandable sentences to enable the examiners to understand. Others just mentioned the points without giving explanations which resulted in the loss of marks. On the contrary, a few students who scored high marks and attained high grades were observed through their responses to understand well the concepts used and consequently met the demands of the questions.

4.2 Recommendations

The following recommendations need to be considered to improve students' performance in future assessments:

(a) Teachers should adopt better teaching and learning approaches as per the topic and lesson in question. For example:

(i) Use of *Questions and Answers sessions* to introduce the lesson. The lesson on the concept of agriculture on the topic of Introduction to Agriculture can be introduced using this strategy This will enable students to develop an understanding of what the students already know, engage them and keep their attention, stimulate critical and creative thinking, encourage the students to explore and refine their understanding and emphasize and summarize what is important.

(ii) *Group discussions* can be used to develop new knowledge. The students can acquire for example knowledge of the contribution of science and technology in the development of the agricultural sector on the topic of Introduction to Agriculture. Discussions help the students to explore and interpret materials, promote deeper understanding and long-term retention of materials, increase participation, and attention and maintain focus, thus active learning.

(iii) *Use of teaching aids/authentic environment:* for example when teaching crop plant diseases on the topic of Crop Husbandry, the use of actual plants affected by different diseases can enhance students' knowledge of crop plant diseases. In addition, the use of audio and visual aids to help students consolidate the gained knowledge. For example, a video showing the functioning of drainage structures on the topic of *Principles of Crop Production* can strengthen the understanding of the students. This is because teaching aids enable clear understanding, make the teaching and learning process interesting and personalized, save time, provide experience, develop motor skills and increase attention. Some aids for example videos, allow the students to learn at their own pace with instant playback, rewinding and pause.

(iv) *Use of field studies* can be used to reinforce knowledge that has been acquired. For example, field study in various farms where crops have been affected by diseases on the topic of Crop Husbandry. Field study provides students with an opportunity to practice skills and techniques, stimulate higher understanding and reinforcement of previously learned materials.

(b) Teachers should regularly assess and evaluate the understanding of the students using assessment tools like assignments, exercises and tests. This can facilitate the establishment of extra or remedial classes whenever necessary.

(c) Schools management should design mechanisms to provide learning platforms for students to learn and practice the use of the English language to improve their language proficiency. For example, debate clubs, essay writing competitions, radio listening, TV watching, English clubs and academic use of social media.

(d) Teachers should be trained in innovative pedagogies and thus orient students on how to attempt examination questions. Including the need to carefully read the questions to clearly understand their demands before attempting them.

Appendix

Students' Performance per Topic in FTNA 2023

SN	Topic	Question Number	Percentage of the Students who Scored an Average of 30% or Above	Comments
1.	Introduction to Agriculture, Principles of Crop Production, Introduction to Livestock Production, Introduction to Soil Science, Basics of Farm Management, Factors of Production Introduction to Crop Production and Crop Husbandry	1	75.94	Good
2.	Basics of Farm Management	8 & 10	42.93	Average
3.	Introduction to Crop Production	9	41.71	Average
4.	Mechanisation in Agriculture	5	41.38	Average
5.	Introduction to Livestock Production	3	39.02	Average
6.	Introduction to Agriculture	4	25.58	Weak
7.	Crop Husbandry	2	21.57	Weak
8.	Principles of Crop Production	6 & 7	12.31	Weak