

### 3.8 AGRICULTURE (443)

In the year 2021, K.C.S.E Agriculture Examination consisted of three papers; Paper 1, Paper 2 and Paper 3. The three papers tested the candidates' competence in understanding the agricultural principles, concepts and practices as stipulated in the syllabus. A wide range of knowledge and skills was tested to bring out the different abilities of the candidates. The format of the three papers is as follows:

- **Paper 1 (443/1):** This is a theory paper that covers General Agriculture, Crop Production, Agriculture Economics and Soil and Water Conservation. It has three sections, A, B and C, which are marked out of 30, 20 and 40 marks respectively.
- **Paper 2 (443/2):** It is also a theory paper but covers Livestock Production, Farm Power, Farm Machinery, Farm Structures and Farm Tools and Equipment. It has three sections, A, B and C, which are also marked out of 30, 20 and 40 marks respectively.
- **Paper 3 (443/3):** This is a project paper with two project questions, **Project A** and **Project B**. In 2021, one of the projects required candidates to **establish a vegetable crop** while the second one was on **rearing of livestock**. Candidates selected and carried out only one of the two projects. The project paper is scored out of 100 marks.

#### 3.8.1 Candidates' Overall Performance

The table below shows the general performance of candidates in the year 2021 KCSE Agriculture Examination. Performance in the previous four years has been included for comparison.

*Table 14: Candidates overall performance in Agriculture for the last five years*

YEAR	PAPER	CANDIDATURE	MAXIMUM MARK	MEAN SCORE	STANDARD DEVIATION
2021	1		90	29.55	15.38
	2		90	42.01	18.78
	3		20	06.12	2.49
	<b>Overall</b>	<b>317,692</b>	<b>200</b>	<b>77.28</b>	<b>34.22</b>
2020	1		90	39.08	17.05
	2		90	56.29	21.40
	3		20	8.15	2.99
	<b>Overall</b>	<b>300,878</b>	<b>200</b>	<b>102.66</b>	<b>39.70</b>
2019	1		90	31.09	15.39
	2		90	27.27	12.68
	3		20	6.46	2.34
	<b>Overall</b>	<b>289,315</b>	<b>200</b>	<b>64.82</b>	<b>28.83</b>

YEAR	PAPER	CANDIDATURE	MAXIMUM MARK	MEAN SCORE	STANDARD DEVIATION
2018	1		90	20.81	11.78
	2		90	31.58	15.20
	3		20	4.24	1.88
	Overall	278,658	200	60.57	27.36
2017	1		90	26.21	13.86
	2		90	23.28	12.25
	3		20	5.41	2.31
	Overall	247,265	200	54.75	26.82

The following observations can be made from the summary in the table:

- (i) Candidates' performance in Agriculture dropped. This is shown by the decrease in the overall mean score from **102.66** in 2020 to **78.22** in 2021. **Paper 1 (443/1)** mean score dropped from **39.08** in 2020 to **29.55** in 2021. The mean score for **Paper 2 (443/2)** also dropped from **59.29** in 2020 to **42.01** in 2021.
- (ii) The overall standard deviation dropped from **39.70** in 2020 to **34.22** in 2021. However, the value of the standard deviation indicates that the papers adequately discriminated candidates of different abilities.
- (iii) The candidature increased from **300,878** in 2020 to **317,692** in 2021. A similar trend was also observed in the previous four years.

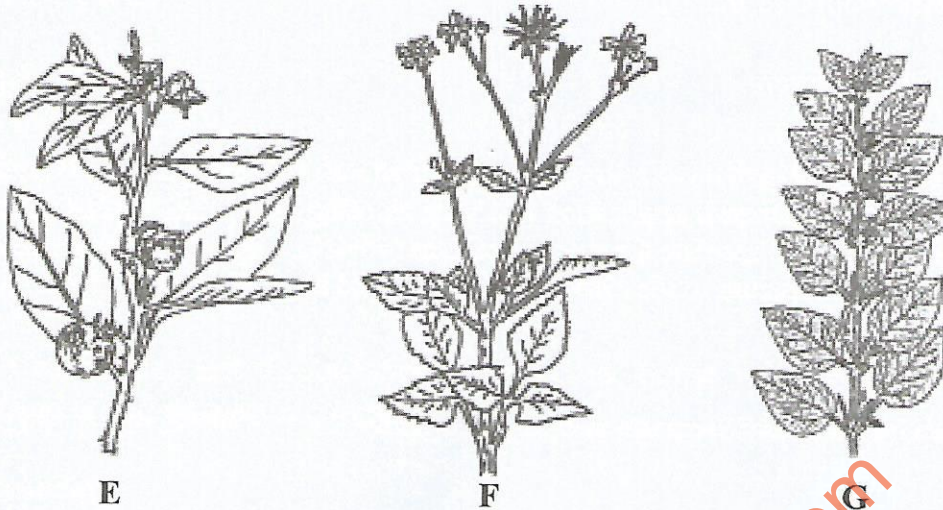
### 3.8.2 ANALYSIS OF POORLY PERFORMED QUESTIONS

Below is an analysis of the items that posed some challenge to the candidates. This report highlights the questions and gives the expected responses. It also offers a general advice to teachers on the possible methodologies to emphasise during instruction.

#### 3.8.3 Agriculture Paper 1 (443/1)

**No question was reported by the Chief Examiner to have been difficult. However, candidates had challenges in handling the following questions:**

The diagrams below show certain weeds.



(a) Identify the weeds labelled F and G.

F ..... (1 mark)

G ..... (1 mark)

(b) State **one** way in which each of the weeds labelled E and F affects the quality of livestock products.

E ..... (1 mark)

F ..... (1 mark)

(c) State the **main** way in which the weed labelled G interferes with farm operations.

(1 mark)

**Expectation**

This question required candidates to apply how the characteristics of weeds influence farming activities.

**Weaknesses**

Most of the candidates were not able to associate the characteristics of the weeds to their effects in crop and livestock production.

**Advice to teachers**

Learners should be engaged to understand the characteristics of weeds and how they affect crop and livestock production.

**Expected responses**

- (b) E – Poisonous to livestock  
F – Contaminates wool and fur 2 x 1 = 2 marks
- (c) G – It irritates farm workers. 1 mark

**Question 17**

17. (a) An agronomist recommends application of 120kg N, 60kg P<sub>2</sub>O<sub>5</sub> and 80kg K<sub>2</sub>O after testing a soil sample. Calculate the amount of urea (46%N), single super phosphate (20% P<sub>2</sub>O<sub>5</sub>) and potassium oxide (50% K<sub>2</sub>O) that should be applied on the land. (4 marks)
- (b) Distinguish between fertiliser ratio and fertiliser grade. (1 mark)

**Expectation**

The candidates were required to (a) calculate the quantity of fertilizer required when provided with the fertilizer grade and (b) distinguish between fertilizer grade and fertilizer ratio.

**Weaknesses**

Most of the candidates were not able to work out the calculations to obtain the quantity of fertilizer required. They were also not able to distinguish between fertilizer grade and fertilizer ratio.

**Advice to teachers**

The learners should be properly guided on fertilizer calculations using fertilizer grades and ratios.

**Expected responses**

17.(a)	(i) Urea (46%N) $= \frac{120 \times 100 \text{ kg urea}}{46} = 260.87 \text{ kg Urea}$ (ii) Single super phosphate (20% P <sub>2</sub> O <sub>5</sub> ) $= \frac{60 \times 100 \text{ kg SSP}}{20} = 300 \text{ kg SSP}$ (iii) Potassium chloride (50%K <sub>2</sub> O) $= \frac{80 \times 100}{50} \text{ kg KCL} = 160 \text{ kg KCL}$	4 x 1 (4 marks)
(b)	Fertilizer ratio refers to the proportion of the three primary macronutrients in a fertilizer, e.g. NPK (10:10:10). Fertilizer grade indicates the amount of each nutrient contained in a fertilizer, e.g. urea (46%N)	1 x 1 (1 mark)

A farmer has a piece of land 200 m long and 36 m wide. If the farmer plants beans at a spacing of 30 cm  $\times$  15 cm, calculate the plant population on the piece of land. Show your working.

(5 marks)

### Expectation

The candidates were required to determine plant population using the area of the land and spacing provided.

### Weaknesses

Most of the candidates left the question unanswered. Some were unable to convert metres into centimetres and ended up with incorrect answers.

### Advice to teachers

The teachers should emphasize the conversion aspect when calculating plant population.

### Expected responses

<p>Plant population</p> $= \frac{\text{Area of land}}{\text{spacing}};$ $= \frac{(36 \times 200) \text{ m}^2}{(0.3 \times 0.15) \text{ m}^2}$ $= \frac{7200}{0.045};$ <p>= 160,000 plants;</p>	<p>5 x 1</p>	<p>(5 marks)</p>
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## 3.8.3 Agriculture Paper 2 (443/2)

No question was reported by the Chief Examiner to have been difficult. However, the following question was a challenge to some candidates.

## Question 19

A poultry farmer wants to prepare 200 kilograms of chick mash containing 20% Digestible Crude Protein (DCP). Calculate the amount of maize (10% DCP) and fish meal (60% DCP) the farmer requires to make the chick mash. Use the Pearson's square method and show your working. (5 marks)

## Expectation

The candidates were required to work out the quantity of raw materials required to prepare a given quantity of feed when the percentage Digestible Crude Protein (DCP) is provided.

## Weaknesses

Most of the candidates were unable to work out the quantity of raw materials required.

## Advice to teachers

Properly guide learners on how to determine feed rations using the raw materials and DCP values provided.

## Expected responses

19.	Fish meal 60	10 parts fish meal	(1 mark)	
	Maize meal 10	40 parts maize meal	(1 mark)	
		total 50	(1 mark)	
	Fish meal $\frac{10}{50} \times 200\text{kg} = 40\text{kg}$		(1 mark)	
	Maize meal $\frac{40}{50} \times 200\text{kg} = 160\text{kg}$		(1 mark)	(5 marks)

### 3.8.4 PAPER 3 (443/3 –PROJECT)

The agriculture project paper was administered to provide an opportunity for the candidates to show and put into practice, the psychomotor skills acquired during the four years' period in secondary school.

Candidates are tested in practical skills in the growing of a selected crop from land preparation to harvesting, rearing selected livestock to maturity, or constructing a farm structure such as beehive, feed trough, rabbit hutch, compost pit/heap, among others.

The instructions are taken to schools, which then provide the required inputs for candidates to carry out the project work independently.

In the year 2021, candidates chose between vegetable crop establishment and livestock rearing. The agriculture teacher's duty was to objectively assess and evaluate each candidate's work at all the stages of project implementation. The assessment by the teacher is based on the class such that there is an even distribution of scores from the lowest, average and finally to the highest performers.

### 3.8.5 GENERAL ADVICE TO TEACHERS

- (i) The whole syllabus should be effectively covered during instruction because examination items will be sampled from the entire syllabus. A topic should not be ignored because it was recently or is never tested. All the topics are tested.
- (ii) The teacher/school should acquire the relevant reference materials and assist candidates to obtain and use the recommended textbooks. The approved books are found in the orange book published by the Kenya Institute of Curriculum Development.
- (iii) The use of textbooks by teachers should always be guided by the syllabus. The specific objectives stipulated in the syllabus should be correctly interpreted to ensure the topics in question are taught at the appropriate breath and depth.
- (iv) A variety of teaching methods and resources should be utilised by teachers to ensure that the content is effectively delivered during instruction. Resource persons/guest speakers and field visits should be arranged and used in areas where the teacher and the school lack the resources to teach the topic/lesson effectively. Agriculture is a science and should be treated accordingly during instruction. The teaching and learning process should go beyond the mere statement of facts. The candidates should be able to explain and apply the knowledge acquired during instruction. Many candidates had problems in answering questions of high cognitive demand.
- (v) All the suggested practical activities in the syllabus should be carried out to prepare candidates adequately for questions that require application of psychomotor skills acquired during instruction.