3.8 AGRICULTURE (443)

In the year 2012, 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 in order 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 **B**. In 2012, Project A required candidates to **rear rabbits** while B was on production of **carrots or napier grass**. Candidates selected and carried out only one of the two projects. The 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 2012 KCSE Agriculture Examination. Performance in the previous five years has been included for comparison.

Table 15: Candidates overall performance in Agriculture for the last four years

YEAR	PAPER	CANDIDATURE	MAXIMUM MARK	MEAN SCORE	STANDARD DEVIATION
2012	**1**		90	38.87	15.15
	2		90	25.61	12.86
	Overall	**178419**	**180**	**69.96**	**28.85**
2011	**1**		90	26.33	13.73
	2		90	40.30	15.29
	Overall	**167,709**	**180**	**74.33**	**29.62**
2010	**1**		90	24.82	11.58
	2		90	36.07	15.07
	Overall	**140,237**	**180**	**67.96**	**27.12**
2009	**1**		90	33.54	15.10
	2		90	34.91	13.49
	Overall	**137,217**	**180**	**77.67**	**29.12**
2008	1		90	32.32	15.11
	2		90	25.59	11.64
	Overall	**134,039**	**180**	**67.1**	**27.32**
2007	1		90	26.94	12.04
	2		90	53.98	16.89
	Overall	**121,193**	**180**	**87.34**	**28.00**

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

(i) Candidates' performance in Agriculture dropped. This is shown by the drop in the overall mean score from **74.33** in 2011 to **69.96** in 2012. **Paper 1 (443/1)** mean score improved from **26.33** in the year 2011 to **38.87** in the year 2012. The mean score for **Paper 2 (443/2)** dropped from **40.30** in the year 2011 to **25.61** in the year 2012.

(ii) The overall standard deviation was **28.85**. The value of the standard deviation indicates that the two papers were able to adequately discriminate candidates of different abilities.

(iii) The candidature increased from **167,709** in the year 2011 to **178,419** in 2012. A similar trend was also observed in the years **2011**, **2010**, **2009, 2008** and **2007**. This is a likely indication of increasing popularity of the subject in schools.

3.8.2 ANALYSIS OF POORLY PERFORMED QUESTIONS

The following is the analysis of the items that were poorly performed by candidates in the year 2012 KCSE Agriculture examination. This report highlights these 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 difficult questions were reported in this paper.

3.8.4 Agriculture Paper 2 (443/2)

Questions 3

Name two nutritional diseases of cattle. (1 mark)

Weaknesses

- Most candidates were unable to name nutritional diseases.

Expected responses

- milk fever/*Parturient puresis*.
- bloat/*Ruminal tympany*
- Grass tetany/grass staggers

(2 x ½ = 1 marks)

Question 4

State two advantages of housing calves singly in cattle management. (1 mark)

Weaknesses

- Most candidates did not understand the importance of housing calves singly. This could be an indication that during instruction, teachers simply mention that calves should be housed singly without explaining the importance of doing it.

Expected responses

- control diseases.
- controls parasites.
- prevents formation of hair balls in the rumen.

(2 x ½ = 1 mark)

Question 6

Name three methods of harvesting fish in a pond. (1½ marks)

Weaknesses

- Most candidates could not name the methods of harvesting fish. Some instead named the local tools used for fishing. This could be an indication that the content area may not have been adequately covered during instruction.

Expected responses

- use of seine nets
- use of scoop net
- draining the pond

(3 x ½ = 1½ marks)

Question 7

State five methods of dehorning in cattle management. (2½ marks)

Weaknesses

- Most candidates were unable to state the methods of dehorning in cattle.

Expected responses

- Caustic potash stick/potassium hydroxide.
- Dehorning spoon.
- Elastrator and rubber ring.
- Dehorning iron
- Dehorning wire/saw
- Dehorning chemical collodion

(5 x ½ = 2½ marks)

Question 8

Give the appropriate term that refers to each of the following:

(a) castrated chicken (½mark)

(b) young one of a rabbit (½ mark)

(c) mature male goat. (½ mark)

Weaknesses

Most of the candidates were not able to give the correct identities of stages of livestock.

Expected responses

(a) capon.
(b) kindling.
(c) Buck/billy.

(3 x ½ = 1½ marks)

Question 9

Give three ways in which farmers market beef cattle in Kenya. (1½ marks)

Weaknesses

- Most candidates were not able to give the methods of marketing beef cattle in Kenya.

Expected responses

- Kenya Meat Commission.
- Livestock Marketing Division, Ministry of Livestock Development.
- Local slaughter houses/butcheries
- Licensed stock traders

(3 x ½ = 1½ marks)

Questions 11

Name two practices that are carried out when preparing ewes for mating. (1 mark)

Weaknesses

Many candidates were unable to name the practices that prepare ewes for mating. Some may not have understood the meaning of ewes; a technical term used at this level.

Expected response

- Flushing.
- Crutching.
- Treatment against parasites/diseases

(2 x ½ = 1 marks)

Question 12

Give four reasons for identification in cattle management. (2 marks)

Weaknesses

- Most candidates could not give the reasons for identification in cattle management.

Expected response

- Selection for breeding.
- Facilitates treatment of sick animals.
- Culling of poor animals.
- Identification for special feeding.
- For record keeping on an animal.
- Identification of lost/stolen animal.

(4 x ½ = 2 marks)

Question 13

State three advantages of fold system in poultry rearing. (1½ marks)

Weaknesses

Many candidates did not know the advantages of the fold system of poultry rearing. May be an indication they may not have understood the fold system of poultry rearing.

Expected responses

- Uniformly spreads manure/dropping in the field.
- Requires less feeding.
- Reduces parasite/disease build up.
- Protects birds from predators.

(3 x ½ = 1½ marks)

Question 16

State three functions of a lubrication system on a tractor. (1½ marks)

Weakness
Most candidates were unable to give the functions of a lubrication system on a tractor. This could be an indicator of inadequate coverage of farm machinery during instruction.

Expected responses

- Reduces friction between moving parts.
- Reduces heat produced by rubbing surfaces/cooling effect.
- Cleaning agent
- Prevents rusting. (3 x ½ = 1½ marks)

Question 17

Distinguish between the following terms as used in livestock health:

(a) isolation and quarantine; (2 marks)
(b) curative drug and prophylactic drug. (2 marks)

Weaknesses

Most candidates were not able to distinguish the terminologies used in livestock health.

Expected responses

(a) Isolation and quarantine

Isolation is the separation of infected livestock from the rest of the herd to prevent spread of the disease.
Quarantine is preventing livestock from moving into or out of an area during an outbreak of a notifiable disease.

(2 marks)

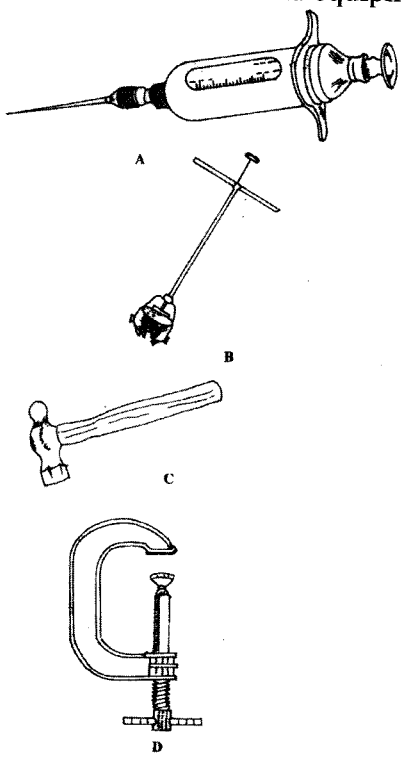
(b) Curative drug and prophylatic drug

- Curative drug is a drug administered when an animal is sick/already infected.
- Prophylactic drug is a routine drug administered to an animal to prevent infection.

(2 marks)

Question 18

Below are illustrations of farm tools and equipment.



(a) Identify the tool/equipment labelled A and B.
A ..... (1 mark)
B ..... (1 mark)

(b) State one appropriate use of the tool labelled C. (1 mark)

(c) Explain two maintenance practices for the tool labelled D. (2 marks)

Weaknesses

The question was based on farm tools and equipment. The content area is covered in form one but most candidates were unable to identify, give the function and the maintenance practices of the tools presented.

Expected responses

(a) **A** - Hypodermic syringe and needle
(Rej. Hypodermic syringe alone)
B - Soil auger (2 x 1 = 2 marks)

(b) Straightening bent metal surfaces/riveting/striking head of cold chisel. (1 mark)

(c) Cleaning after use to remove dirt.
Greasing/oiling to reduce friction.
Apply oil/painting to prevent rusting (2 x 1 = 2 marks)

Question 20 (b)

Explain three disadvantages of the identification method. (3 marks)

Weaknesses

Most candidates were unable to explain the disadvantages of branding. Some could only state the disadvantages. This could be an indication that instruction rarely goes beyond the statement of facts.

Expected responses

(b) Reduces quality of hides/skins because the heat damages the skin/hide
Causes the animal a lot of pain because it uses heat
Causes wounds which can result in infections
(3 x 1 = 3 marks)

Question 22 (a)

Describe the functions of the various types of pens in a piggery unit. (4 marks)

Weaknesses

The question was optional and it was rarely answered by candidates. This could be an indicator that pig rearing is not adequately covered during instruction.

Expected responses

- Farrowing pen for farrowing and rearing piglets.
- Boar's pen houses the boar and also used for mating.
- Weaners/Fatteners pen houses piglets from weaning to marketing stage
- Gilts pen houses young females upto service age/12 months.
- In-pig pen houses pregnant pigs before they are moved to the farrowing pen. (4 x 1 = 4 marks)

Question 23 (b)

Give the reasons why embryo transfer use should be encouraged in dairy cattle breeding. (8 marks)

Weaknesses

Many candidates could not give the reasons for embryo transfer. Embryo transfer is closely related to artificial insemination. Being a new technology in animal breeding, teachers may not be giving it adequate emphasis during instruction.

Expected responses

- The calf is born in the local surrounding to minimize effects of climatic changes.
- It is possible to screen and market sexed embryos to minimise the number of male calves.
- It controls sexually transmitted diseases
- Embryos can be stored for a long time awaiting for a recipient female.
- It allows faster multiplication of a superior animal/breed i.e a cow can produce 12 - 15 embryos per year.
- It stimulates production of milk in females that were not ready/able to produce milk.
- Can be used as a study / research tool on a given sire / dam because many offsprings can be produced within a short time for observation.
- It allows the embryo to obtain passive immunity from the surrogate mother.
- The use of embryo saves the cost of production on rearing bulls.
- Embryos are cheaper than animals of equal value.
- Embryo are easy and cheap to transport in test tubes compared to live animals.
- High yielding embryos can be implanted into less valuable females to improve production in the calves obtained.
- Easy to plan for breeding.
- Prevents injury of cows by heavy bulls. (8 x 1 = 8 marks)

Question 24 (b)

Explain the importance of each of the functional differences between a disc plough and a mouldboard plough in land preparation. (10 marks)

Weaknesses

The compound nature of the question may have disorganised the candidates. Some were simply stating the differences between disc and mouldboard ploughs. They were not able to isolate how the differences between the two ploughs are utilized in land preparation.

Expected responses

(i) Disc plough rolls over obstacles hence good for areas with obstacles e.g. stones, roots, stumps, etc
(ii) Disc plough works better in fields with trash on the surface due to rolling and cutting action of discs.
(iii) Disc plough requires less draught power because of the rolling ability of the discs.
(iv) Mould board plough is rigid hence ploughs at a uniform depth.
(v) Mould board plough completely inverts the soil slices hence good for burying manure into the soil.
(vi) Use of a mould board plough requires fewer secondary operations because it completely inverts soil slices.
(vii) Disc plough can work on any soil condition this allows the farmer to work with it any time.
(5 x 2 = 10 marks)

3.8.5 Agriculture Paper 3 (443/3 – PROJECT)

The agriculture project paper is 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. The project takes eight months, from February to September of the given year.

In the year 2012, candidates chose between rabbit rearing and production of carrots or napier grass. 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 should be on the basis of the class such that there is an even distribution of scores from the lowest, average and finally the highest performers. Inflating project scores disadvantages the candidates when standardisation is done.**

3.8.6 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 adequately and effectively.

(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.