

AGRIC SCIENCE (TYPE F)

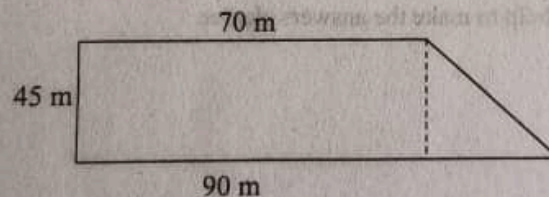
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PAPER II

Answer **five** questions only, **one** from each section.

SECTION A

1. (a) Enumerate **four** ways by which non-governmental organisations contribute to agricultural development. (4 marks)
- (b) Give **four** reasons government provides agricultural education to nomads in Nigeria. (4 marks)
- (c) State **four** principles of farmstead layout. (4 marks)
- (d) List **four** problems facing farm mechanization in Nigeria. (4 marks)
2. (a) Mention **four** disadvantages of land tenure system by inheritance in Nigeria. (4 marks)
- (b) Itemise **four** major aspects of animal production and management where science and technology have played important roles. (4 marks)
- (c) Highlight **four** daily maintenance practices of a tractor. (4 marks)
- (d) The diagram below represents Johnny-Eze plantain plantation survey.



Calculate the area of the plantation in hectares. (4 marks)

SECTION B

3. (a) Enumerate **four** effects of soil acidity on crop production. (4 marks)
- (b) State **four** advantages of mixed farming. (4 marks)
- (c) List **four** ways organic manuring help in soil conservation. (4 marks)
- (d) Give **four** major factors that should be considered before choosing subsurface irrigation method for the production of arable crops on a farmland. (4 marks)

4. (a) State **two** effects each of the following farming practices on soil:

- (i) Clean clearing
- (ii) Fertilizer application
- (iii) Flooding

(2 marks)

(2 marks)

(2 marks)

- (b) Copy and complete the table below:

S/N0	Types of rock	Two Examples
(i)	Plutonic rock	(i) _____ (ii) _____
(ii)	Mechanically formed Sedimentary rock	(i) _____ (ii) _____
(iii)	Metamorphic rock	(i) _____ (ii) _____

(2 marks)

(2 marks)

(2 marks)

- (c) Mention **four** ways by which sunlight affects agricultural production. (4 marks)

SECTION C

5. (a) Enumerate **four** conditions that makes the practise of taungya farming in Nigeria necessary. (4 marks)

- (b) Itemise **four** cultural methods of pest control in crop farming. (4 marks)

- (c) Nwala and Sons Goat Farm planted puero on a land measuring 500 m × 1,500 m at the spacing of 20 cm by 30 cm in May, 2020.

- (i) Calculate the area of the pasture land. (2 marks)
- (ii) If 30% c.f the seeds did not germinate, what will be the total puero population at the end of 2020? (3 marks)

- (iii) Mention **one** cultural practice that should be carried out to achieve the initial expected population of puero by the farm manager. (1 mark)

- (iv) List **two** physical features of puero. (2 marks)

6. (a) State **five** reasons weeds are difficult to eradicate. (5 marks)
- (b) Mention **five** forestry regulations in Nigeria. (5 marks)
- (c) Copy and complete the table below.

S/N0	Crop disease	Two Symptoms	
(i)	Groundnut rosette	(i)	(2 marks)
		(ii)	
(ii)	Cocoa black pod disease	(i)	(2 marks)
		(ii)	
(iii)	Stored produce mould	(i)	(2 marks)
		(ii)	

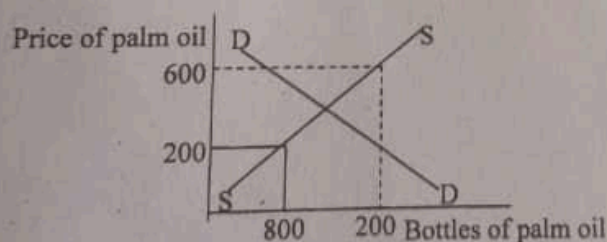
SECTION D

7. (a) List **five** symptoms of malnutrition in farm animals. (5 marks)
- (b) Itemise **five** disadvantages of extensive system of managing farm animals. (5 marks)
- (c) A breeder crossed a high beef producing bull (BB) with a high milk producing cow (MM) in 2020. In 2022, he crossed the offspring of the F_1 generation to get F_2 .
- (i) Illustrate the crossings from the parents to the F_2 generation. (3 marks)
- (ii) How many of the F_1 offsprings will be dual purpose calves? (1 mark)
- (iii) What is the ratio of high beef producer to high milk producer in F_2 ? (1 mark)
- (iv) State the genotypic ratio of the offspring in F_2 . (1 mark)

8. (a) State **three** functions each for the following food nutrients in the body of a sheep:
- (i) Water (3 marks)
 - (ii) Mineral (3 marks)
- (b) Give **three** benefits of building houses for farm animals. (3 marks)
- (c) Mention **one** reason each for the following practices commonly carried out when breeding a sow:
- (i) Flushing a breeder stock (1 mark)
 - (ii) Provision of laxative diet (1 mark)
 - (iii) Deworming of a breeder gilt (1 mark)
 - (iv) Avoidance of overfeeding (1 mark)
- (d) Describe **three** behavioural features of bees. (3 marks)

SECTION E

9. (a) (i) Define opportunity cost. (2 marks)
- (ii) State **three** importance of law of diminishing return in agricultural production. (3 marks)
- (b) Study the market equilibrium graph below and use it to answer the questions that follow.



- (i) Calculate the excess bottles of palm oil demanded by consumers. (1 mark)
 - (ii) What is the equilibrium price? (1 mark)
 - (iii) State **one** way through which the market equilibrium price of palm oil is determined. (1 mark)
- (c) Give **three** examples of electronic media used in agricultural extension teaching. (3 marks)
- (d) List **five** problems encountered by extension workers in relating to farmers. (5 marks)

10. (a) Suggest **four** ways by which the problems of extension services in Nigeria can be solved. (4 marks)
- (b) List **four** roles of extension services in agro-forestry system. (4 marks)
- (c) Enumerate **four** marketing functions of a horticulturist. (4 marks)
- (d) Give **four** reasons for government's support of exportation of agricultural produce from Nigeria despite food scarcity. (4 marks)

(1a)

(i) Provision of Improved Agricultural Inputs: NGOs provide farmers with improved seeds, fertilizers, agrochemicals, livestock breeds, and other farm inputs that help increase agricultural productivity.

(ii) Provision of Agricultural Education and Extension Services: They train and educate farmers on modern farming techniques, improved production methods, pest control, and efficient farm management practices.

(iii) Provision of Credit Facilities: Some NGOs provide loans, grants, and financial support to farmers to enable them purchase inputs, expand their farms, and improve production.

(iv) Support for Agricultural Research and Innovation: NGOs support research activities aimed at developing improved crop varieties, livestock breeds, and modern agricultural technologies.

(1b)

(i) To Improve Livestock Production: Agricultural education helps nomads acquire knowledge on improved animal feeding, breeding, disease control, and general livestock management.

(ii) To Introduce Modern Farming Techniques: It exposes nomads to better methods of animal production and encourages the adoption of improved agricultural practices.

(iii) To Reduce Illiteracy: Agricultural education helps improve the literacy level and social development of nomadic communities.

(iv) To Promote National Development: Educating nomads enables them to contribute effectively to agricultural production and participate in government development programmes.

(1c)

(i) Proper Location of Farm Structures: Farm buildings should be arranged in suitable locations to allow easy movement, efficient operation, and future expansion.

(ii) Accessibility: The farmstead should have good roads and pathways for easy movement of workers, farm machines, inputs, and products.

(iii) Good Drainage and Sanitation: Farm structures should be located on well-drained land to prevent flooding, disease outbreak, and unhealthy conditions.

(iv) Efficient Land Utilisation: The layout should ensure proper use of available land without unnecessary wastage.

(1d)

(i) High Cost of Machinery: Farm machines such as tractors and harvesters are expensive and beyond the reach of many small-scale farmers.

(ii) Lack of Skilled Operators: Many farmers lack adequate knowledge and technical skills needed to operate and maintain machines effectively.

(iii) Poor Maintenance Facilities: Inadequate repair workshops, spare parts, and technical personnel limit effective mechanisation.

(iv) Small and Fragmented Land Holdings: Most Nigerian farms are small and scattered, making the use of large machines difficult and uneconomical.

(2a)

(i) Land Fragmentation: Inheritance often divides farmland among family members, resulting in small and scattered plots which reduce efficiency and productivity.

(ii) Difficulty in Farm Expansion: Farmers may find it difficult to acquire more land because ownership is shared among several heirs.

(iii) Land Disputes: Inheritance systems may create conflicts among family members over ownership, boundaries, and usage rights.

(iv) Discourages Long-Term Investment: Farmers may hesitate to invest in permanent improvements such as irrigation systems and tree crops due to uncertainty of ownership.

(2b)

(i) Animal Breeding: Science and technology have improved animal breeds through artificial insemination, selection, and genetic improvement.

(ii) Animal Nutrition: Technology has helped in producing balanced feeds, feed supplements, and improved feeding methods.

(iii) Animal Health Management: Scientific methods have improved vaccination, disease diagnosis, treatment, and prevention of livestock diseases.

(iv) Animal Housing and Management: Modern technology has introduced improved housing systems and better methods of managing farm animals.

(2c)

(i) Checking Engine Oil: The engine oil level should be checked daily and maintained properly to ensure smooth engine operation.

(ii) Checking Radiator Water Level: The radiator should be inspected and filled with enough water to prevent overheating.

(iii) Checking Tyre Pressure: Tyre pressure should be checked and maintained at the correct level for stability and efficient operation.

(iv) Lubricating Moving Parts: Moving parts should be properly lubricated to reduce friction and prevent excessive wear.

(2d)

Given: Top base = 70 m, Bottom base = 90 m, Height = 45 m

Area of trapezium:

$$A = \frac{1}{2}(a+b)h = \frac{1}{2}(70+90) \times 45 = \frac{1}{2}(160) \times 45 = 80 \times 45 = 3600 \text{ m}^2$$

Conversion: 1 hectare = 10,000 m²

$$3600 \div 10000 = 0.36 \text{ ha}$$

Area of the Johnny-Eze plantain plantation = 0.36 hectares

(3a)

(i) Reduction in Nutrient Availability: Soil acidity reduces the availability of essential nutrients such as phosphorus, calcium, and magnesium needed for proper crop growth.

(ii) Toxicity of Certain Elements: Highly acidic soils increase the concentration of toxic elements such as aluminium and manganese, which can damage plant roots.

(iii) Poor Crop Growth and Yield Reduction: Acidic conditions affect root development, nutrient absorption, and overall crop performance, leading to low yields.

(iv) Reduction in Soil Microbial Activities: Soil acidity reduces the activities of beneficial microorganisms responsible for decomposition and nutrient release.

(3b)

(i) Efficient Use of Farm Resources: Crop residues can be used as animal feed, while animal wastes can serve as manure for crops.

(ii) Increased Income Sources: Farmers obtain income from both crop and livestock production.

(iii) Reduction of Production Risks: Failure of one enterprise does not result in total loss because farmers have other sources of income.

(iv) Improvement of Soil Fertility: Animal manure improves soil structure and adds nutrients needed for crop production.

(3c)

(i) It improves soil structure and prevents soil erosion.

(ii) It increases the water-holding capacity of the soil.

(iii) It adds organic matter and improves soil fertility.

(iv) It encourages the activities of beneficial soil organisms.

(3d)

(i) Soil Type: The soil should allow proper movement and distribution of water underground.

- (ii) Availability of Water Supply: Adequate and reliable water source must be available for effective irrigation.
 - (iii) Cost of Installation and Maintenance: The farmer should consider the cost involved in setting up and maintaining the system.
 - (iv) Nature of the Crop: The irrigation method should be suitable for the type of crop grown.
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(4a)

- (i) Clean Clearing: Exposes the soil to erosion by wind and water; reduces organic matter content of the soil.
- (ii) Fertilizer Application: Excessive use can increase soil acidity; may cause soil pollution and destroy useful soil organisms.
- (iii) Flooding: Reduces soil aeration by filling soil spaces with water; may cause nutrient leaching and loss of soil fertility.

(4b)

[TABULATE]

Under Plutonic rock

- (i) Granite
- (ii) Gabbro

Under Mechanically formed Sedimentary rock

- (i) Sandstone
- (ii) Shale

Under Metamorphic rock

- (i) Marble
- (ii) Slate

(4c)

- (i) Photosynthesis: Sunlight provides energy needed by green plants to manufacture food.
 - (ii) Crop Growth and Development: Adequate sunlight promotes healthy growth and proper development of crops.
 - (iii) Seed Germination and Flowering: Light influences germination, flowering, and fruit formation in some crops.
 - (iv) Drying of Agricultural Products: Sunlight helps in drying harvested crops such as grains and fruits for storage.
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(5a)

- (i) Need for Forest Regeneration: Taungya farming helps to regenerate forest areas by combining tree planting with crop production.

- (ii) Shortage of Agricultural Land: It provides an opportunity for farmers to produce crops while trees are being established on forest lands.
- (iii) Need to Control Soil Erosion: Planting trees helps protect the soil from erosion and improves environmental conservation.
- (iv) Need for Food Production: It allows farmers to produce food crops while contributing to forest development.

(5b)

- (i) Crop Rotation: Growing different crops on a piece of land prevents pests associated with a particular crop from building up.
- (ii) Proper Farm Sanitation: Removal and destruction of crop residues and weeds helps eliminate pest breeding sites.
- (iii) Early Planting: Planting crops early helps them escape periods of severe pest attacks.
- (iv) Use of Resistant Varieties: Planting pest-resistant crop varieties reduces damage caused by pests.

(5ci)

Given: Length = 1,500 m, Breadth = 500 m, Spacing = 20 cm × 30 cm

Area of pasture land:

$$\text{Area} = \text{Length} \times \text{Breadth} = 1500 \times 500 = 750,000 \text{ m}^2$$

(5cii)

Total puero population after 30% seed failure:

$$\text{Spacing: } 0.2 \text{ m} \times 0.3 \text{ m} \rightarrow \text{area per plant} = 0.06 \text{ m}^2$$

$$\text{Expected plants} = 750,000 \div 0.06 = 12,500,000$$

$$70\% \text{ germinated: } 70/100 \times 12,500,000 = 8,750,000 \text{ plants}$$

(5ciii)

One cultural practice to achieve the expected population: Thinning and gap filling; replacing dead seedlings with healthy ones to maintain the required plant population.

(5civ)

Two physical features of puero:

- (i) It has creeping stems that spread along the ground.
 - (ii) It has broad green leaves with a high forage value.
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(6a)

- (i) High Seed Production: Many weeds produce large quantities of seeds which increase their spread.

(ii) Long Seed Dormancy: Some weed seeds remain dormant in the soil for many years before germinating.

(iii) Deep Root Systems: Some weeds have deep roots or underground structures that make removal difficult.

(iv) Rapid Growth Rate: Weeds grow quickly and compete strongly with crops.

(v) Adaptability: Many weeds can survive under different environmental conditions.

(6b)

(i) Prohibition of illegal cutting of trees without government approval.

(ii) Establishment and protection of forest reserves.

(iii) Regulation of hunting and protection of wildlife species.

(iv) Requirement of permits before timber exploitation.

(v) Enforcement of tree planting and reforestation programmes.

(6c)

[TABULATE PLEASE]

Under Groundnut rosette

(i) Yellowing of leaves

(ii) Stunted growth of plants

Under Cocoa black pod disease

(i) Dark brown/black lesions on pods

(ii) Rotting of cocoa pods

Under Stored produce mould

(i) Growth of mould on stored products

(ii) Discolouration and spoilage of produce

(7a)

(i) Stunted Growth: Animals suffering from nutrient deficiency show poor growth and development.

(ii) Loss of Weight: Inadequate nutrients cause reduction in body weight and poor body condition.

(iii) Rough and Dull Hair/Feather: Animals may develop poor-quality hair or feathers due to lack of essential nutrients.

(iv) Reduced Productivity: Malnourished animals produce less milk, meat, eggs, or other products.

(v) Weakness and Disease Susceptibility: Poor nutrition weakens the immune system, making animals easily affected by diseases.

(7b)

- (i) Low Productivity: Animals usually grow slowly and produce less meat, milk, or eggs due to limited management.
- (ii) Poor Disease Control: It is difficult to monitor and control diseases because animals move freely over large areas.
- (iii) High Risk of Predators and Theft: Animals are exposed to attacks by wild animals and theft.
- (iv) Difficulty in Feeding Management: Farmers have little control over the quality and quantity of feed consumed by animals.
- (v) Requires Large Land Area: The system needs large areas of land, which may be difficult to obtain.

(7c)

Given: High beef producing bull = BB, High milk producing cow = MM

(i) Crossings from parents to F_2 generation:

P: BB $\times$ MM $\rightarrow$ Gametes: B $\times$ M $\rightarrow F_1$: all BM (dual purpose calves)

$F_1 \times F_1$: BM $\times$ BM $\rightarrow$

Under B (from one parent)

- (i) BB (with B)
- (ii) BM (with M)

Under M (from one parent)

- (i) BM (with B)
- (ii) MM (with M)

F_2 generation: BB : BM : BM : MM

(ii) Number of F_1 offspring that will be dual purpose calves: All F_1 offspring (100%) will be dual purpose calves because they have genotype BM.

(iii) Ratio of high beef producer to high milk producer in F_2 : BB : MM = 1 : 1

(iv) Genotypic ratio of F_2 : 1 BB : 2 BM : 1 MM

(8a)

[TABULATE]

Under Functions of Water in the body of a sheep

- (i) It regulates body temperature through cooling processes.
- (ii) It helps in digestion and absorption of nutrients.
- (iii) It transports nutrients and removes waste products from the body.

Under Functions of Minerals in the body of a sheep

- (i) They help in the formation and strengthening of bones and teeth.
- (ii) They regulate body processes such as nerve and muscle activities.
- (iii) They support reproduction and proper growth.

(8b)

- (i) Protection from Harsh Weather: Animal houses protect livestock from excessive heat, rain, and cold.
- (ii) Disease Control: Proper housing helps maintain cleanliness and reduces the spread of diseases.
- (iii) Easy Management: Housing makes feeding, breeding, medication, and monitoring of animals easier.

(8c)

- (i) Flushing a breeder stock: It is done to improve the nutritional condition of the animal and increase conception rate.
- (ii) Provision of laxative diet: It helps prevent constipation and prepares the animal's digestive system before breeding.
- (iii) Deworming of a breeder gilt: It is carried out to remove internal parasites and improve health before reproduction.
- (iv) Avoidance of overfeeding: It prevents excessive fatness which may reduce breeding performance.

(8d)

- (i) Social Behaviour: Bees live together in colonies with different groups performing specific duties.
 - (ii) Communication: Bees communicate through movements such as the waggle dance to show the location of food sources.
 - (iii) Division of Labour: Worker bees perform tasks such as collecting nectar, feeding young ones, and protecting the hive.
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(9a)

- (i) Opportunity Cost: The value of the next best alternative that is forgone when a choice is made among competing alternatives.
- (ii) Importance of Law of Diminishing Returns in Agricultural Production:
 - (i) Helps in Efficient Use of Resources: It helps farmers determine the level at which additional inputs should be applied to avoid wastage.
 - (ii) Assists in Production Planning: Farmers use it to decide the most profitable combination of inputs such as labour, fertilizer, and capital.
 - (iii) Prevents Unnecessary Increase in Cost: It helps farmers avoid applying excessive inputs that may reduce profit.

(9b)

(i) Excess bottles of palm oil demanded by consumers:

Quantity demanded = 800 bottles, Quantity supplied = 200 bottles

Excess demand = $800 - 200 = 600$ bottles

(ii) Equilibrium Price: The price where the demand and supply curves intersect. Equilibrium price = ₦600

(iii) Determination of Market Equilibrium Price: The market equilibrium price is determined by the interaction between demand and supply forces in the market.

(9c)

(i) Radio

(ii) Television

(iii) Internet/online agricultural platforms

(9d)

(i) Low Literacy Level of Farmers: Some farmers find it difficult to understand and adopt new agricultural technologies.

(ii) Poor Communication Network: Poor roads and transportation facilities make it difficult for extension workers to reach farmers.

(iii) Inadequate Funding: Lack of funds limits the ability of extension workers to carry out effective programmes.

(iv) Resistance to Change: Some farmers are unwilling to abandon traditional farming methods.

(v) Shortage of Extension Personnel: Few extension workers are available to serve a large number of farmers.

(10a)

(i) Adequate Funding: Government should provide enough funds for extension programmes, training, and field activities.

(ii) Recruitment of More Extension Workers: More trained personnel should be employed to reach more farmers.

(iii) Improvement of Transportation Facilities: Provision of vehicles and better roads will enable extension workers to access rural areas easily.

(iv) Continuous Training of Extension Workers: Regular training should be provided to update workers with modern agricultural technologies.

(10b)

- (i) Educating Farmers on Tree Management: Extension workers teach farmers proper methods of planting and managing trees.
- (ii) Promoting Sustainable Land Use: They encourage practices that conserve soil and protect the environment.
- (iii) Introducing Improved Agro-Forestry Technologies: They provide information on improved tree species and farming techniques.
- (iv) Providing Technical Advice: They guide farmers on combining trees with crops and livestock for better productivity.

(10c)

- (i) Transportation: Moving horticultural products from farms to markets or consumers.
- (ii) Storage: Preserving harvested products to reduce losses and maintain quality.
- (iii) Grading and Standardisation: Sorting products according to size, quality, and market requirements.
- (iv) Packaging: Preparing products properly for handling, transportation, and sale.

(10d)

- (i) Generation of Foreign Exchange: Exporting agricultural products earns foreign currency for national development.
 - (ii) Promotion of Economic Growth: Agricultural exports contribute to government revenue and economic development.
 - (iii) Encouragement of Agricultural Production: Export opportunities motivate farmers to increase production.
 - (iv) Improvement of International Trade Relations: Exportation strengthens economic relationships between Nigeria and other countries.
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