



Dr. Blosa Science

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The Science Foundation College
Uganda East Africa
Senior one to senior six
+256 778 633 682, 753 802709
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UACE P515/2 Principles and practices of agriculture2 2018

Instructions

- This paper consists of sections: **A, B, C, D and E**
- Answer **question 1** in section A and four other questions, selecting **one** from each of the sections **C, D and E**.
- Write your answers in the answer booklets provided
- Any additional question(s) answered will not be marked

SECTION A (20MARKS)

Question1 is compulsory

1. (a) What is supply? (03marks)
(b) Table 1 shows a supply schedule of meat

Price (Ug. Shs)	Quantity of meat supplied per month(Tons)
12,000	8.0
10,000	7.0
8,000	5.0
6,000	2.5
5,000	1.0

Plot the information on a graph with the price on the vertical axis and supply on the horizontal axis. (07marks)

- (c) Explain the shape of the curve (05marks)
- (d) Explain factors that influence supply. (05marks)

SECTION B (20MARKS)

CROP PRODUCTION

Answer **one** question from this section

2. (a) Give the meaning and one benefit of the following as used in crop breeding (06marks)
 - (i) Polyploidy
 - (ii) Hybridization
 - (iii) Back crossing
- (b) Describe the procedure of mass selection in crop improvement. (06marks)
- (c) Outline the husbandry practices a farmer should adopt to obtain high maize yields. (08marks)
3. (a) Using an illustration describe the procedure of preparing liquid manure from cow dung. (12 marks)
- (b) Explain why there is more use of inorganic manure than organic manure by farmers in Uganda. (08 marks)

SECTION C (20MARKS)

ANIMAL PRODUCTION

Answer **one** question from this section

4. (a) Explain factors that affect utilization of feed by farm animal (12marks)
- (b) What is the role of rumen microorganism in the digestive system of a ruminant. (04 marks)
- (c) Outline the conditions that favor multiplication of microbe in the rumen (04marks)
5. (a) Explain why identification of animals is important. (06marks)
- (b) What are the guidelines for proper identification of farm animals? (04marks)
- (c) Describe the procedure to used and precautions to take when branding an animal using hot iron. (10marks)

SECTION D (20MARKS)

AGRICULTURAL ENGINEERING

Answer **one** question from this section

6. (a) Discuss the factors that are considered when planning a farm layout. (14marks)
- (b) Outline the benefits of proper farm planning? (06marks)

7. (a) Explain the merits and demerits of used of animal drawn implements (10marks)
- (b) How can a farmer obtain optimum power output from draft animals?. (06marks)
- (c) Outline practices that should be carried out to maintain ox-plough. (04marks)

SECTION D (20MARKS)

AGRICULTURAL ECONOMICS

Answer **one** question from this section

8. (a) State the factors that contribute to population size changes in Uganda. (05 marks)
- (b) Explain Malthusian theory on population in relation to food production (10 marks)
- (c) Outline the causes of famine in some parts of Uganda (10 marks)
9. (a) Give the meaning of each of the following:?
 - (i) land tenure (02marks)
 - (ii) Land consolidation (02marks)
- (b) Suggest the problems of land fragmentation. (09marks)
- (c) Outline the benefits of land consolidation. (07 marks)

END

Suggested answers

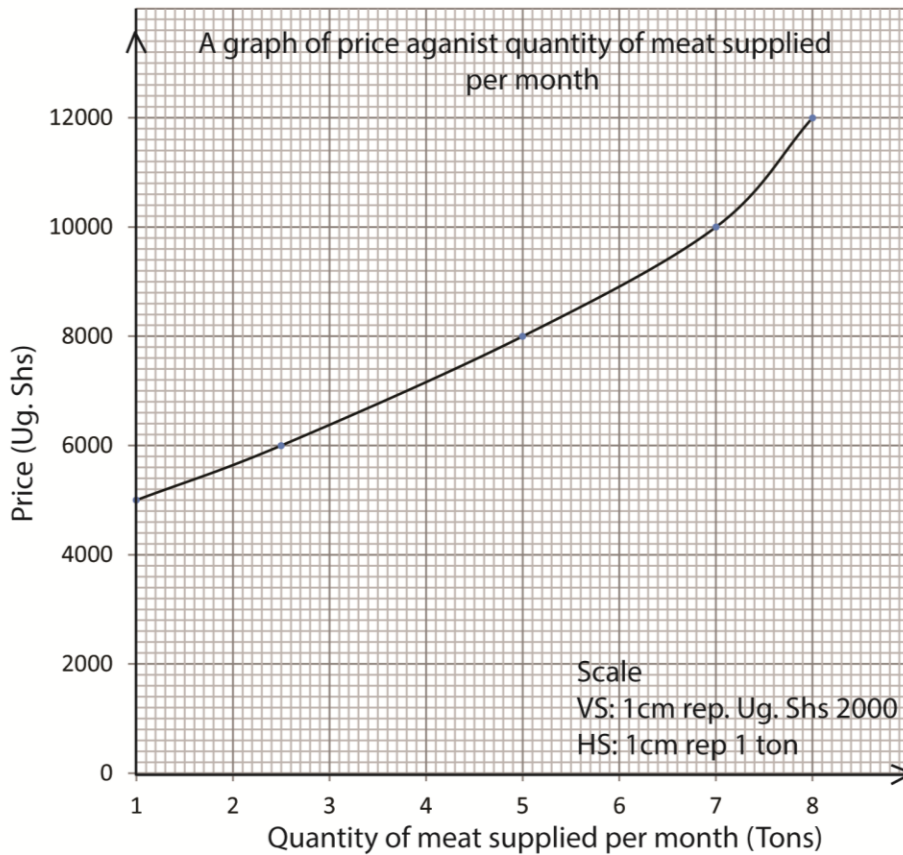
1. (a) What is supply? (03marks)

Supply is the total amount of a given product or service a supplier offers to consumers in a given period and at a given price level.

(b) Table 1 shows a supply schedule of meat

Price (Ug. Shs)	Quantity of meat supplied per month(Tons)
12,000	8.0
10,000	7.0
8,000	5.0
6,000	2.5
5,000	1.0

Plot the information on a graph with the price on the vertical axis and supply on the horizontal axis. (07marks)



(c) Explain the shape of the curve (05marks)

The higher the price, the higher the quantity of product supplied because higher prices lead to more profit for producers, so they are encouraged to supply more.

(d) Explain factors that influence supply. (05marks)

- **The price of the commodity.** The higher, *the higher the quantity supplied and the lower the price of the commodity the lower the quantity supplied.*
- **The number of producers of the commodity.** The higher the number of producers of the same commodity the greater the quantity supplied, and the smaller the number of suppliers, the lower the quantity supplied:
- **Level of costs of production.** A reduction in the factor prices reduces the cost of production and this leads to an increase in supply but an increase in the costs of production discourages producers and this leads to a fall in the quantity supplied.
- **Degree of availability of factor inputs.** An increase in the supply of factor inputs in form of raw materials increases quantity supplied of the commodity but a reduction in the supply of factor inputs reduces the quantity supplied of the product.
- **Degree of freedom of entry of firms in production.** Free entry of firms increases the supply of the commodity while restricted entry of firms reduces the supply of goods.
- **Level of technology used in production.** Use of better technology increases the quantity supplied but in case the technology used is inefficient the quantity supplied reduces e.g. tractor versus a hand hoe.
- **Nature of the working conditions.** Favorable working conditions in form of higher wages, transport and food allowances etc. motivate workers to work hard and this increases quantity supplied of the product. But unfavorable working conditions encourage workers to become inefficient and therefore quantity supplied of the product decreases.
- **The length of the gestation period.** This is the time taken for a commodity to be ready on market. The longer gestation period, the lower the quantity supplied and the shorter the gestation period, the higher the quantity supplied.
- **Goal of the firm.** A firm that aims at profit maximization may put less quantity on market and charge a high price hence reducing the quantity supplied of the commodity but for the firm aiming at sales maximization, quantity supplied of the product increases.
- **Government policy,** increasing taxes by the government on the producers of a certain commodity increases the cost of production and this reduces quantity supplied of the product. But subsidization of producers by the government in form of reduced prices for factor inputs increases the quantity supplied of the commodity.
- **The nature of climate.** Favorable climate increases the supply of produce.
- **Degree of political stability of the country.** A politically stable country encourages investments and production of goods and services hence increasing the supply of commodities. But a politically unstable country discourages the production of goods and services hence a fall in the supply of commodities.

- **The size of the market**, the bigger the market size, the higher the supply of the commodity **and** the smaller the market size, the lower the supply of the commodity.
- **Future price expectations.** An expected future increase in the price of the commodity by the producers reduces the current supply of the commodity. This is because they expect to sell at a higher price and earn more profits in future. But an expected future fall in the price increases the current supply of the commodity. This is because the producers want to avoid making losses by selling at lower prices in future

SECTION B (20MARKS)

CROP PRODUCTION

Answer **one** question from this section

2. (a) Give the meaning and one benefit of the following as used in crop breeding (06marks)
- (i) Polyploidy
- Polyploidy is a condition in which an organism's cells have more than two complete sets of chromosomes.
- Benefits of polyploidy
- increased sized of plant
 - reduced fertility
 - high resistance to harsh climate
 - increased yield
 - increased resistance to diseases
- (ii) Hybridization
- Hybridization or cross breeding refers to the process of producing offspring by mating two parents from different varieties or species.
- Benefits of hybridization in agriculture
- Produces varieties that are
- disease resistant crops
 - high yielding
 - drought resistance
- (iii) Back crossing

This is a cross between hybrids in F1 generation with one of the parents or an organism genetically equivalent to the parents.

Benefit of back crossing

Back crossing is mainly aimed at increasing the genetic contribution of one particular parent to the off spring.

(b) Describe the procedure of mass selection in crop improvement. (06marks)

- Seeds from many plants with desirable characteristics are collected and mixed together.
- The seeds are planted on the same field and the result seeds from these crops are selected and marked as a new variety.

(c) Outline the husbandry practices a farmer should adopt to obtain high maize yields. (08marks)

- Till the field remove weeds and improve on the soil aeration
- Timely planting at the beginning of the season
- Plant high yield, drought and disease resistant maize seeds
- Maintain proper spacing
- Apply fertilizers
- Keep the field free of weeds
- Spray pests and disease
- Practice crop rotation to maintain soil fertility.

3. (a) Using an illustration describe the procedure of preparing liquid manure from cow dung.

(12 marks)

- (i) Break down the cow dung cake into small pieces.
- (ii) Soak the cow dung cake in water until it is completely submerged. Mix it well with a stick.
- (iii) Cover the container and place it in a shaded area.
- (iv) After 3 days, the solution will turn into a dark brown color.
- (v) Apply to the plants

(b) Explain why there is more use of inorganic manure than organic manure by farmers in Uganda.

(08 marks)

- Inorganic fertilizers provide nutrients in a form that plant can absorb immediately leading to quicker growth and higher yields
- Farmers can make precise ratios for tailored for specific application
- Inorganic manures are easy to transport.
- Inorganic manures are easy to store

- Inorganic manures are easy to apply using machines compared to organic manure.
- Inorganic manure provide consistent nutrient content whereas the nutrient content in organic manure can vary depending on its source
- Can be applied at any stage of growth
- Contain nutrients of known concentration

SECTION C (20MARKS)

ANIMAL PRODUCTION

Answer **one** question from this section

4. (a) Explain factors that affect utilization of feed by farm animal (12marks)
- The nutrient requirement of for the animals whose ration is being formulated
 - The palatability or acceptability of the final mixture of the feed
 - Availability of ingredients and their cost
 - Health status of the animal
 - Nutrient composition of the final mixture
 - The wholesomeness of the food stuff. The final mixture should not harmful to the animals
 - Age of animal i.e. young animal requires high proportion of proteins
 - Level of production for instance milk cattle and layer require high proportion of calcium.
 - Type of animal for instance ruminant can digest cellulose
- (b) What is the role of rumen microorganism in the digestive system of a ruminant? (04 marks)
- They produce enzymes that break down cellulose to simple carbohydrates such as acetic acids
 - Synthesize useful proteins from non-protein sources for the animals
 - Synthesize useful vitamins such as K, C and B complexes that are utilized by host animals
 - Protect ruminant against pathogens
- (c) Outline the conditions that favor multiplication of microbe in the rumen (04marks)
- Favorable pH (6.2 – 6.8) which maintained by saliva and continuous removal of volatile fatty acid.
 - Low level of oxygen since most of these microbes are anaerobic.
 - Enough moisture
 - Supply of readily fermentable carbohydrates such as sugar and starch
 - Adequate supply of energy and nitrogen which enhances microbial activity
5. (a) Explain why identification of animals is important. (06marks)
- Enable a farmer to recognize his animal in case it's lost or theft.
 - Helps to monitor and manage health of an animal such as vaccination records
 - Helps in selecting animals for breeding by keeping track of their genetic traits and performance

- To facilitate record keeping for each animal such as birth date, health history, etc.
- It makes easier to identify unproductive or sick animal for culling
- For regulatory compliance

(b) What are the guidelines for proper identification of farm animals? (04marks)

- (i) Choose the appropriate method of identification for a given species and purpose
- (ii) Use unique symbols (code, number, letter or combination of numbers and letters) for each animal to avoid confusion
- (iii) Keep detailed record of each animal's identification number, sex, date of birth, breeding and/or production record.
- (iv) Follow local and national regulations regarding animals identification
- (v) Make regular updates of records to reflect any changes, such as new births, sale or death.
- (vi) Train staff in identification methods and protocol
- (vii) Consider using electronic identification system for easier tracking and data management

(c) Describe the procedure to used and precautions to take when branding an animal using hot iron. (10marks)

Branding involves sealing numbers, letters, designs or a combination of this on the skin of the animal.

Hot Iron branding is done using a **branding iron** which is heated and stamped on the animal skin to leave marks for identification.

Procedure of hot iron branding

- Restrain the animal in a crush
- Heat the branding iron in fire or gas until red hot
- Stamp the hot iron on a less valuable part of the animal to burn the skin and leave marks
- Remove the iron from the skin after a few seconds
- Release the animal from the crush

Precaution

- The body of the animal should be dry
- Hot iron should be pressed for a short time to prevent damage to animal
- The marks should be put on least valuable part of the skin like lower part of the thigh, jaw and hump

SECTION D (20MARKS)

AGRICULTURAL ENGINEERING

Answer **one** question from this section

6. (a) Discuss the factors that are considered when planning a farm layout. (14marks)

- Topography: the site should be gentle sloping, free from flooding and erosion
- Soil type and climate to make the right choice of crops and animals
- Accessibility: the site should be easily accessible to ease transportation and other farm activities
- Security: the site should be protected from theft and vandalism
- Water supply: the farm site should be able to access water for animals and irrigation.
- Consider Local zoning laws and land use regulations
- A farm site should access electricity
- Future expansion: there should be room for expansion
- Government regulation: farm site location should obey government regulation
- Relationship between enterprises: building for related enterprises should be located close to one another.
- Panoramic view: a homestead and farm house should be located in such a way that the farm can easily be monitored.
- Farmers preference
- Environmental impact of the farm: implement measures to prevent soil erosion, waste management and protect natural resources

(b) Outline the benefits of proper farm planning? (06marks)

- Resource optimization: proper planning helps in efficient utilization of resource such as water, and labor leading increase yields.
- Allows a farm easy access in to emergencies such as fire outbreak
- Reduces wastage on a farm by planning for catastrophes such as flooding
- Sustainability: farm planning encourages environmentally friendly practices to maintain soil health, conserve water and protect natural resources ensuring long-term productivity.
- Financial planning: farm planning aids budgeting and resource allocation, making it easier for farmers to secure funding and manage finances effectively
- A well-planned farm layout and infrastructure streamline operations, monitoring reduce wastage and improve overall productivity.
- A well planned farm reward from the community

- Farm planning improves security of a farm

7. (a) Explain the merits and demerits of used of animal drawn implements (10marks)

Merits of using ox-mould board plough the farm

- Mouldboard plough produces much uniform seedbed. It ploughs at uniform depth and produces uniform furrows.
- It gives a complete inversion of the furrow slices to completely burry and kill surface vegetation
- The furrow slices are well crushed to give a fine soil tilth favorable for germination of seed.
- It leaves the soil surface relatively smooth since the furrows have shallow depressions and there are no uncultivated strips of land between the furrows.
- It relatively light that it requires less power
- It is cheap

Merits of using mechanical planter

- Plants faster and saves time
- Even placement of seeds
- Reduced seed wastage
- Used in fertilizer application

Merits of using Carts and Wagons:

Ease transport on the farm

Demerits using of animal drawn equipments

- They do less work compared to tractors
- Cannot cope up with heavy work; only operate shallow cultivation
- Require land for grazing
- Pulverization of soil encourage soil erosion
- Easily damaged and incur costs to repair
- For animals that work in pair when one animal is sick the other does not work.
- Animals easily tire up when hot or very cold.

(b) How can a farmer obtain optimum power output from draft animals? (06marks)

- Give the oxen enough water
- Feed the animals so that it does not eat crops
- Yoke the animals properly
- Hold the animals for a while in the dressing room to allow them to settle and calm down
- Check the feet of the animals and ensure that the hooves are sound and if necessary pair them
- Fix a muzzle on their mouth to prevent animals from browsing crops.

- Ensure that the implements e.g. a plough is in proper order by sharpening the share and tightening all loose nuts and bolts.
- Pairing of draught animals to increase traction
- Properly maintaining and servicing the ploughs
- Use correct share for a given soil condition
- Ensure proper hitching of plough on the yoke
- Drive the oxen at constant speed
- Clear the field of tall grass and tree stumps before using the animals
- Provide good housing to protect the animal from bad weather.
- Timely treatment of animals.
- Control parasites
- Avoid over working the animals
- Work the animal during good weather
- During off season the animals should be made to pull carts to ensure that they do not forget

(c) Outline practices that should be carried out to maintain ox-plough. (04marks)

- Regular checking of the conditions of the share; it should be re-sharpened if blunt
- Regularly tight the bolts and nuts
- Replace worn out heel of the land slide
- Clean the plough regularly
- Lubricate the movable parts
- Paint parts to prevent rusting
- Store in cool dry places

SECTION D (20MARKS)

AGRICULTURAL ECONOMICS

Answer **one** question from this section

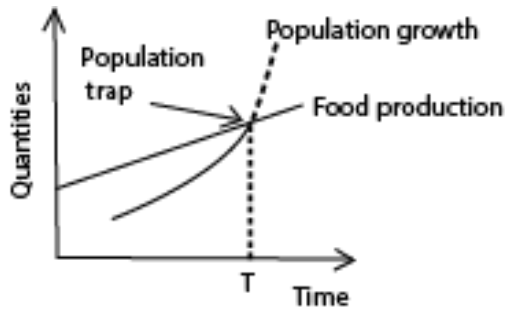
8. (a) State the factors that contribute to population size changes in Uganda. (05 marks)

- birth rate,
- death rate,
- emigration,
- immigration
- survival rate

(b) Explain Malthusian theory on population in relation to food production (10 marks)

The theory states that **food production will not be able to keep up with growth in the human population, resulting in disease, famine, war, and calamity.**

This because food production grows arithmetically while population grows (faster) geometrically; thus there will come a given point in time, T, (population trap) when the population would outstrip the means of subsistence leading to starvation, diseases, wars and death (positive checks)



Malthus suggested that the only way to avoid human suffering beyond the population trap; population growth must be checked by preventive negative checks such as celibacy, late marriages, family planning, moral restraint, etc.

(c) Outline the causes of famine in some parts of Uganda (10 marks)

Human factors

- Political instability in many parts of Uganda such as Kasese has kept the population on the run this failing to carry out productive activity including farming.
- Subsistence production where whatever food is produced is for consumption. This limits production of excess food for storage and consequently famine in case of delayed rainfall.
- Poverty/ unemployment leading to insufficient resources and becomes worse if the head of the family is unemployed.
- The over and population explosion leads to shortage of food and thereby off-setting famine.
- Poor storage facilities also contribute to famine in a sense that many homes do not have ways of keeping the dry ration. Food is lost during seasons of harvest and shortage follows shortly after.
- Poor technology and poor farming methods such as use of rudimentary tools lead to poor crop yields and lack effective preservation means lead to high post-harvest losses.
- Poor land tenure system where majority lack land to plant food crops and hence famine
- Rural urban migration drains farmland of labour leading to low farm yield
- Poor government policies like taxation and the failure to plan for the agriculture ministry, failure to produce and sustain enough skilled manpower, and provide extension services.
- Corruption and embezzlement by government official and failure to implement government policies.
- Poor transport network hinders movement of food from its source in remote areas to the market or where it is consumed. Therefore surplus food cannot easily reach places of scarcity.

Others factors /Physical factors

- Pests and diseases damage and destroy crops and animals leading to inadequate food production
- Poor and unfertile soils lead to limited agricultural and food production.
- Rugged terrains that do not support mechanization and limit the sizes of farms affecting food production.
- Natural calamities such as landslides on Mt. Elgon, flooding e.g. in Kasese. Earthquakes etc. These destroy crops and property leading to low food production
- Climate vulnerabilities such as variable seasons and frequent droughts.

9. (a) Give the meaning of each of the following:

(i) land tenure (02marks)

These are rules and conditions governing the ownership of land in a specific area.

(ii) Land consolidation (02marks)

This is the pooling of small pieces of land to form a large and more productive land when put together.

(b) Suggest the problems of land fragmentation. (09marks)

- It's difficult to supervise all plots effectively.
- Large scale/commercial farming is not possible
- Farmers fail to secure land title deeds.
- Farmers fail to access social services such as road, water for irrigation etc.
- Farm planning is difficult due to the small size of the fragments.
- It encourages low agriculture production.
- Theft of farm produce is common due to reduced supervision.
- Agricultural mechanization is expensive due to the small size of the plots which are scattered.
- It's difficult to offer agricultural extension services on such scattered plots.
- It's difficult to carry out soil conservation measures due to the distance involved.
- Pest and disease control on the fragments is difficult.
- It's difficult to control grazing since farmers have small plots that are prone to overstocking and overgrazing.

(c) Outline the benefits of land consolidation. (07 marks)

- Saves time that could have been wasted moving from plot to plot during farm operations.
- Makes supervision of farm operations easy and less costly since they are in one place.
- It encourages mechanization on a farm since the land is big enough which makes the practice economical.
- Agricultural production is increased due to the size of the land.
- It's easier to provide extension services on the consolidated land.
- Theft of farm produce is reduced due to improved supervision.
- Transport costs of the produce from the garden are reduced since all products are in one place.
- It's easier to control pests and diseases on the farm.
- It's easier to carry out soil and water conservation measures.

END

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Thanks

Dr. Bbosa Science