MSCE AGRICULTURE

MODULE I – SOIL DEGRADATION

1. What is soil degradation?

Soil degradation is the loss in value and quality of soil.

2. **Describe any three forms of soil degradation.**

- Physical degradation – occurs when rain or machinery destroys soil. The broken particles are then eroded through wind or rain water (puddle erosion)

- Chemical degradation – occurs when soil degradation results after excessive use of fertilizers and pesticides.

- Biological degradation – occurs when soil is tramped by people or animals by breaking down the soil and easily eroding by wind or rain.

3. What are the causes of soil degradation?

The causes of soil degradation are: -

- Bad farming methods – cultivating steep slopes and river beds which encourage erosion
- Constructing ridges along the slope which accelerates hill or gully erosion
- Using heavy machinery, which destroys soil structure.
- Continuous cropping which exhausts the soil and makes is prone to soil erosion.
- Cultivating the soil when it is too dry or we which damages the soil structure.

4. What are effects of soil degradation?

The effects of soil degradation are:-

- Loss of fertile top soil and eventually reduces crop yields.
- Reduced infiltration and increased water run-off.
- Silting of water resources due to sedimentation
- Pollution of water resources.
- Rivers drying up and water becoming scarce
- Low ground water table due to run-off
- Increased incidence of flooding
- Loss of arable land due to gullies that are formed
- Loss of grazing land.

5. How can soil degradation be controlled?

Soil degradation can be controlled by: -

- Ensuring that vegetation soil cover is maintained
- By Biological soil conservation measures to help reduce damaged cased by rainfall.
- By physical conservation measures to reduce the speed of running water (storm drums, constructing box ridges and counter bands across the slope).

MODULE 2 – CROP IMPROVEMENT

1. What is crop Improvement?

Crop improvement refers to the process of creasing the productivity of cultivated plants by developing better-cultivated varieties, which possess superior characteristics.

1. **Discuss the following statement "improving the GENETYPE OF CROPS GUARANTEES END WORLD HUNGER"**

   "Plant breeders strive to improve the genotype of crops in order to develop superior crop varieties that satisfy the need of farmers, processors and consumers. This activity will result in crop improvement.

2. **Explain any 5 objectives of crop improvement in maize that would contribute towards ending hunger**.

   Objectives relating to increase quantity of yields include: -

   - To increase biomes in order to increase yields per hectare.
   - To improve partition in order to improve the desired harvestable portion of the plant.
   - To increase resistance to pests and diseases.
   - To improve seasonal adaptation.
   - To increase tolerance to adverse environmental conditions.

   Objectives to increase on quality of yield include: -

   - To achieve uniformity – germination time, growth rate.
   - To promote dwarfness in crops in order to produce shorter varieties to make forestry easier especially in fruit. In rice to reduce plant lodging.
   - To improve processing qualities of crop products as required by processors in industry (high oil content, high fiber, high sugar content).
   - To increase market value of crop products of better colour texture and taste demanded by consumers.

1. **Plant Introduction, Selection and Hybridization are some of the methods of crop improvement.**

   Explain the meaning of each method: -

   - Introduction – This is importation of crop varieties of superior productivity to serve a foundation stocks for breeding or propagating usually after quarantine and testing

   - Selection – This means choosing of superior plants that have certain desirable characteristics of breeding or propagation.

   - Hybridization – Hybridization means cross breeding. It is a process of cross-pollinating two crops or varieties with different characteristics in order to produce a new variety.

5. What are the three main types of hybridization?

   - Choosing parents – Parent varieties must have superior characteristics that compliment each other.

   - Self-pollination that parental lines – The chosen parent are self pollinated (or mated with close relatives) for several generations (5-6 generations). This is in breeding. It is done in order to develop pure lines.

   - Crossing the pure lines – Pollen from one in bred (pure line) is collected and transferred manually to the stigma of the flower of the other inbred.

6. What are the main differences between each of the following?

   i) Mass selection and single plant selection – In mass selection a large number of plant showing desirable characteristics are chosen for seed while in single plant selection only one individual plan for breeding is chosen.

ii) Single cross and double cross hybrids.
iii) Inbreeds and hybrids – Hybrids means cross breeding while inbreed are self-pollinated.
iv) Inbreeding depression heterosis.

Inbreeding depression is caused by reduction of plant vigor through inbreeding while heterosis the new vigor of plant as a result of crossbreeding

MODULE 3 – IMPORTANCE AND TYPES OF PATURE

1. Explain any five reasons why pasture is important?

Pasture is important because.

i) Pasture provides feed to stock grown in Dambos and pasturelands.
ii) Pasture improves and maintains soil fertility by circulating nutrients through the animals back to the soil.
iii) Pasture improves soil structure (decay organic plant material improves soil structure)
iv) Pasture controls pests and diseases because pasture grasses and legumes are resistant to pests and diseases that attach arable crops.
v) Pasture controls soil erosion by protecting the soil from splash erosion.

2. **Describe any 5 benefits that would accrue to a pasture farmer as a result of including legumes in a pasture.**

i) The combined yield from grasses and legumes is higher than in a pure stand (animals eat both when grazing).
ii) The nitrates fixed by the legume pasture are used by the grass to increase the grass yield.
iii) The legumes have a higher protein content, which improves the nutrient content of the feed.
iv) Legumes have higher digestibility even when mature.
v) Legumes retain high nutritive value even when mature, providing the much needed protein in the dry season.

3. Name two main types of pastures in Malawi?

- Natural pastures
- Cultivated pastures

4. What are two main differences between natural and cultivated pastures?

- Natural pastures are not cultivated while the other is cultivated.
- Cultivated pasture tends to give higher dry matter yield.
- Cultivated pastures have legumes, which are beneficial.

5. What are two types of cultivated pastures?

- Permanent pasture which is managed for 10-15 years
- Temporary pastures which is managed for only 3-5 years

MODULE 4 – PASTURE ESTBALISHMENT

1. Describe any four methods of pasture establishment.

i) Broadcasting – pasture is spread on the soil surface
ii) Drilling – see is sown in trenches or holes made by sticks or hoes.
iii) Oversowing – seed is sown in an already established pasture
iv) Undersowing – seed is under growing arable crop such as maize..
v) Vegetation planting – cut stems are used for planting e.g. star grass, Bushman mine panic.

2. **What are the main advantages of oversowing and undersowing methods of pasture establishment?**

OVERSOWING ADVANTAGES

i) It improves the composition of existing pasture through the introduction of other desirable pasture species.
ii) It increases the dry matter yield of natural pasture (unimproved bush)
iii) It increased the quality of natural pastures in terms of protein content.

UNDERSOWING ADVANTAGES

i) It enables pasture to become established a year earlier
ii) It helps a farmer harvest and extra crop of maize from the plot.
iii) It eliminates the cost of land preparation
iv) It ensures that young crop pasture is protected
v) It enables a farmer to obtain a higher total yield from the plot

3. Describe any 5 qualities you would look for when selecting the type of grass or legume pasture establishment.

i) Adaptability to the environment – to choose species suitable for the area.
ii) High overall dry matter per unit area – grass/legumes chosen must be capable of high levels of yield per hectare.
iii) High feed value
iv) Compatibility with desired species – choose species, which can successfully grow together with chosen species.
v) Proposed method of utilization of the pasture – whether they are for hay, silage or grazing.

4. Explain briefly any five factors that affect the seed rate for pasture.

i) Purity of soils
ii) Germination percentage – The higher germination percentage the lower will be the seed rate required to achieve the desired plan population.
iii) Seed size.
iv) Pure or mixed stand
v) Soil tilth
vi) Method of sowing
vii) Method of sowing – Broadcasting requires higher seed rates than drilling.

5. Explain the following: - Seed scarification, seed inoculation, pelleting, and seed hulling:
All the above are seed treatments for pasture.
i) Hulling – This is the removal of the pod around the seed (pounding in Mtondo to remove pods or winnowing) U

ii) Scarification – This is the process which seed coasts (Testa) of some Legumes are softened in order to speed germination (immersing in hot water)
iii) Inoculation – This is the process of mixing legume with the correct type of Rhizobium bacterial before sowing to ensure successful nodulation and nitrogen fixation.
iv) Pelleting – This is the practice of sticking a thin layer of material such as lime, gypsum or rock phosphate around each seen. Pelleting improves legume establishment by correcting the soil pH or soil nutrient deficiencies.

MODULES 5 PASTURE MANAGEMENT AND UTILISATION

1. Explain the role of one of the following nutrients in positive management:- nitrogen, phosphate and potassium.

Nitrogen
Phosphate
Potassium

2. Explain three principles of grazing management:

(1) Controlling Stocking Rate – Right stock rate for the grazing area to avoid wastage overstocking leads to over grazing.
(2) Matching Grazing to Positive Carrying Capacity – The maximum number of animal can be fed on a given area.
(3) Providing sufficient grazing intervals (rest periods): Give enough time to recover when weed is not grazed. Not too long not too short to enable positive recover and be eaten when still fresh.
(4) Rotation Grazing – To rotate to give time for positive to recover.
(5) Strip Grazing:
(6) Zero Grazing (Cut & Carry):-

3. Explain any four reasons for burning natural pastures.

(i) It removes the dry, inedible herbage of the end of dry season so that fresh pasture can grow one more freely.
(ii) It controls shrub re-growing between by preventing bush encroachment.
(iii) It controls pests and diseases by burning them off.
(iv) It reduces competition for growth between potatable and palatable species.

4. Why should frequent burning of nature pasture de discouraged?

(i) It may destroy the legume component of the pasture.
(ii) It may reduce sword vigor if that is so severe as to burn off the rootstock, which provides food for energy to developing roots.

5. Hay and silage are some of the ways of conserving pastures for the dry season. Explain any five advantages of silage and hay.

Hay	**Silage**
It can be kept for a relate long a time	It makes use a variety of forriage.
It provides cheapest source of animal feed	it preserve protein percentage
It supplies most of the energy, vitamins, Minerals & proteins.	it maintains the fresh of
It supplies roughage to satisfy the animal Hunger	It is more palatable than hay

It can be sold for cash

It is free to weed seeds which are killed by heat

It is better preserved and kept as forage

6. Explain five factors that affect the quality of pasture.

(i) Digestibility of the species.
(ii) The ratio of legumes to grasses in the positive
(iii) Palatability of the species grown.
(iv)
(v) Guide protein content of the species.
(vi) Legumes of the species grown.

MODULE 6: CROP PROCESSING AND STORAGE

1. Explain how groundnuts are processed for storage

Groundnuts can be stored in the pod (unshelled) or shelled. Either way groundnuts must be kept dry. Unshelled groundnuts can be stored in sacks and stocked. Just as with maize, shelled groundnuts region drying and cleaning by winnowing for storage.

2. Why is each of the following steps important in processes maize for storage?

(1) Stripping the maize cob sheath – It exposes the given to air foster and proper drying. It ensures that storage pesticides (actellic) reach and protect the grain.
(2) Shelling the grain – It speeds up drying. Shelled grain take up less storage space.
(3) Drying the grain – To dry to 10-12% with content to prevent moulds.
- It reduces respire in the grain.
- It prevents germination of the grain.

(4) Cleaning/Winnowing – To remove chaff and dirt..

3. Explain any four qualities of a good storage facility for maize.

(i) Dry – Prevent moulds.
(ii) Cool – To prevent for being heated and increase the respire
(iii) Airtight – To prevent pathogens, rats and insects pests.

4. Explain the steps needed to prepare sweet potatoes for storage.

(1) Cleaning – removing dirt and de from the tubes.
(2) Selection – removing tubers which are damaged or tube bruise.
(3) Curing – keeping the tubes by spreading them in a cool, dry and shaded place.
(4) Piling – Piling them carefully as they are delicate and less damaged/broken.

5. How is cassava processed for storage?

(1) Fresh cassava is difficult to store as they go bad in a few days.
(2) Cassava is best stored in a processed firm.
(3) Processing cassava reduces the toxicity of the tubes, improves palatability and makes perishable commodity stable enough for storage.
(4) Fresh cassava tubes can be peeled, sliced enough for storage pieces (makaka) can be stored in sacks.

MODULE 7 – THE REPRODUCTIVE SYETEM OF CATTLE AND POULTRY.

1. What is puberty?

Puberty is a stage when the male and female animals reach sexual maturity.

2. At what age do the following animals reach puberty?

Animal	Age
Cattle	8-9 months
Sheep	5-6 months
Goats	5-6 months
Rabbits	7-6 months

3. Explain the four phases of the OESTRUS CYCLE.

Oestrus is the term used to describe the heat period when female animals show the urge or desire to mate.

The stages of oestrus cycles are:

(1) Proestrus – Lost 3 days. At the period the reproduction trech is prepared.
(2) Oestrus – This is the term the animal to more sexual desire.
(3) Metoestrus – At the stage corpus luteum is formed. No more eggs are released.
(4) Dioestrus – The corpus luteum is retained if fertilizer takes place and the animal is pregnant.

4. Explain the meaning of the term 'heat'

The term 'heat' means the period that female animals show the urge or desire to mate or to be serviced.

5. State the signs of heat in a cow

(1) The cow becomes restless.
(2) The cow bellows (mooing)
(3) The cow mounts other cows and stands still when mounted by the other.
(4) The vulva becomes reddened and enlarged.
(5) There is a mucus discharge from the vulva.
(6) There is an increase in un notion.
(7) Milk production declines in lactating cows.

6. State the gestation period of cattle, sheep, goats and rabbits.

Types of Animals	Length of gestation
Cow	283 days
Nanny	150 days
Ewe	150 days
Sow	115 days
Rabbit	31 days

7. Describe the process of reproduction in cattle

- The term "reproduction" means to produce or bear young ones.
- The process of reproduction of in cattle are

(1) Mating (male & female) things mating the egg cells from female are fused with the sperm from the male animal.
(2) Fertilization – the fusing of male and female cells result with fertilization of the egg to form an embryo (zygote)
(3) Giving Birth – The embryo (zygote) develops within the womb and the animal eventually gives birth to lives young.
(4) The term used to animals that bear live ones is viviparous. Mammals are

therefore viviparous.

In a Hen:
Hens may lay eggs, which may not be fertilized. When a cock and hen mate the sperms are introduced into the reproductive systems of the hen. The eggs are laid then fertilized and they hatch at the 21 days. The term used to animals that give birth to young ones in this way is OVIPAROUS.

MODULE 8 – LIVESTOCK IMPROVEMENT.

1. What is livestock improvement?

Livestock improvement refers to the improvement in the genetic inheritance of animals and the

Environment in which they are kept.

2. **State any three aims of livestock improvement**

The aims of livestock improvement are

(1) To increase yield of milk, meat and eggs.
(2) To improve the quality of animal products (butterfat content in milk, size and colour of egg york in egg shells, quality of wool, and toughness of work animals such as oxen)
(3) To increase disease resistance in animals.
(4) To improve the rate of growth improvement.

3. **Describe three methods of livestock improvement.**

(1)Selection – By studying the appearance (phenotype) and performance of animals and their relatives (genotype or genetic make up)
(2) Breeding – By both inbreeding and crossbreeding. In breeding results in pure breeds and cross breeding introduces now blood in the t
(3) Introduction: intruding or importing animals from other continues.

4. **Distinguish between inbreeding and out –breeding.**

In breeding involves the making of loosely elated animal e.g. mother and son. Father and daughter, brother and sister while out –breeding are the opposite. It refers to mating of animals that are not closely related e.g. whom second cousins mate. This introduces now blood in the hard.

5. **What is artificial insemination?**

This is the artificial introduction of sperms into reproductive track of a female animal. This process does not involve mating.

The three advantages of artificial insemination (AI) are

(1) The cost of buying and keeping male animals is elements.
(2) The spread of sexual insemination disease is eliminated.
(3) The sperms can be stored for a longer period and used when required.

6. **Distinguish between natural and artificial selection**

Artificial selection is the selection of animals by farmers based on desirable characteristics or good qualities while natural selection is the selection for breeding of those animals within a group that are better favoured by the environment than others.

8. What is progeny testing and sib selection

Progeny testing is the selection of male animals based on the performance of them offspring.

Sub selection is the selection of female animals for such characteristics as egg production and milk production.

MODULE 9 BEED PRODUCTION

1. **Why is beef cattle production important in Malawi**
   Beef production is important in Malawi because it provides a source of food rich in protein (essential for growth and repair of worn out body tissues) it is also important because it is a source of income things sale of live animals or meet.

2. **List any breeds of cattle**
   i. Malawi Zebu
   ii. Afrikander
   iii. Boran
   iv. Charolais
   v. Herefold
   vi. Brahman
   vii. Simment

3. **How can Malawi Zebu be improved for beef production?**
   Malawi Zebu can be improved for beef production by crossbreeding with Brahman and Friesian although Friesian is mostly used for daily productions.

4. **Describe two beef cattle can be managed under the following headings**:
   Shelter- there should be a khola with enough room and bedding on the floor.
   Feeding- intensive or extensive system of feeding.
   Breeding – Crossbreeding in order to improve production and keeping good animal husbandry.
   Disease parasite control – spraying and dipping animals to kills parasite and drug/vac to kill diseases.

5. **Describe any four diseases that attack diseases that attack cattle and how they can be controlled**.

Diseases	Control
1 East coast fever	no-treatment but restrict movement. Control ticks by dipping.
2 Foot and mouth	no treatment but restrict movement. Slaughter and between infected animals.
3 Mastitis	Treat with antibiotics ege tetecyclines and penicillin.
4 T.B.	Slaughter infected animals and vaccine young animals with BCG vaccine.

6. **Where are the three main internal parasites of cattle? How can they be controlled?**

Parasite	Control
Roundworms	De-worming with phenothiazine Rotational grazing
Tapeworms	Dose with suitable drugs

		Practice rotational grazing.
	Liver flukes	destroy the snail (host) with copper sulphate Avoid grazing animals in dambos to wetlands

7. In which ways are ticks and tsetse flies harmful to cattle. How can they be controlled?

	Parasites	**Damage cause**	**Control**
1.	Ticks	cattle become anaemic Damage hides Wounds source of infection (mastitis) Wealons the cattle therefore affecting Production. Transmit tick bone disease such as East coast fever, heart water, red water and gall sickness.	Frequent dipping of animals and hand spraying them
2.	Tsetseflies	Suck, VO and weaken animals Causing sleeping sickness disease (Tryponosomiasis)	Spraying the animals leaning surrounding bushes

8. Describe the following husbandry practice.

There are done before calves are weaned.

1. Dehorning – remove the horns from cattle to prevent twenty herds boys and other animals.

2. Debudding – stopping the growth of horn buds. To make handling of cows easier and preventing them from hurting each other.
3. Castration – The remove of tastes, which prevents in breeding and makes the anima docile. Animals also fatten quickly and quality of meat is improved.
4. Branding-placing an identification mark or number for ease of identification.

9. **Mention three methods of castration**

Burdizzo
Knife cutting testacles
Rubber ring

10. **What are three disadvantages of extensive system of rearing cattle.**

1. Too many cattle may be kept in a small area causing soil digestion.
2. The control of diseases and parasites is difficult.
3. Animals take longer to reach slaughter weight

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11. What are the advantages of the intensive system of rearing beef cattle?

12. 1. Rotational grazing is practiced allowing grass to grow.
13. 2. Prevents build up of parasites and diseases crossing germs.
14. 3. Cattle fatten up more quickly.
15. 4. Control of diseases and parasites is easier.

MODULE 10 DAIRY PRODUCTION

1. Why is dairy production important in Malawi

1. Dairy products are nutritious because milk is balanced containing water, carbohydrates, proteins, fats, minerals such as phosphorous, sodium and calcium and vitamins such as vitamin A, B, C, D and E.
2. Dairy products are a source of income because farmers sell milk all the year round and cows after lactation can be sold as beef animals.
3. Dairy cows are efficient at converting forage into milk.
4. Cows provide a source of manure, tudes and bones.
5. Dairy production provides a source of employment.

2. List the breeds of cattle for dairy production.

1. friesian
2. Givensey
3. Jersey
4. Ayrshive

3. Describe any four characteristics of good dairy cattle.

1. The body of the cow is lean (without too much flesh) and angular
2. The body is wedge shaped. Compact bad blocky.
3. A dairy cow has a very large udder with teats, which are evenly spaced.
4. The legs are short and strong.

4. Where are the main types of feeds that are suitable for dairy cattle?

1. Elephant Grass
2. Napier Grass
3. Hay
4. Silage
5. Concentrates (maize meal, cotton seed cake, ground nuts cake, madeya, bone meals and salt)

5. Name and describe any two diseases of dairy cattle and then methods of control.

	Disease	**Control**
1.	Mastitis	Treat with antibodies e.g. penicillin Observe hygiene and cleanliness when milking
2.	Milk fever	Feed animals with calcium rich feed or bone meal two months before calving.

6. Describe any four practices of good milking hygiene

1. The milk to wash his/her hands with soaps before milking cows.
2. The Milk to was utensils with warm water.
3. Give the cow concentrate to feed on while being milked.
4. Milk the cow gently and quickly for about 8-10 minutes.

MODULE 11 – TRADING IN AGRICULTURAL COMMODITIES

1. What does the term "trading' mean?

Trading means buying and selling at a profit.

2. Explain three differences between marketing and trading?

Marketing	Trading
-Stresses consumer analyze and satisfaction	-Stresses on sales
-Uses selling as a means of communication with And understating consumers	-Uses selling as means to an end
-Seeks to anticipate, manage and satisfy at a demand at a profit.	-Seeks to dispose of a surplus Profit

3. Explain any three advantages of trading of agricultural commodities at each of the following levels.

I)> Community level – income from sales raises living standards of all concerned and adds to the economic wealth of the community.

>Everyone benefit when the production of different commodities are able to sell their goods to one another.

>Trading increase productivity of the community, since each member does what she or he is best suited to do.

ii) National Level- Trading creates more opportunities and economic activity which improves country economic stability.

- >It increases national output since workers are force and move productive through specialization.
- >It promotes the development of Agro-industries through the provision of raw materials and market for products.

iii. International Level – Trading enables nations earn foreign exchange.

- >Trading often consumers wide choice of products
- >It increases business profit for those engaged in this type of wholesale trade.

4. Describe any five way of promoting international trade of agricultural commodities

(a) By promoting good international relations.
(b) Increasing the volume of production for export commodities such as tobacco, paprika, tea.
(c) Improving transport and storage facilities.
(d) Improving on advertising and sales promotions through trade fairs.
(e) By offering competition prices which are reasonable, relative to those of competitors.

MODULE 12 FARM BUDGETS

1. Distinguish between partial and complete budgets.

Partial budgets are used to assess the profitability of minor changes while complete budgets are used where a farmer intends to open a new farm or want to embark on a major reorganization of the form.

2. Outline the items that make up the costs and income from the partial budget

a. Where extra costs are to be incurred?
b. Where present/existing income is to be forgone or given up?
c. What extra income it to be earned?
d. What existing / present costs are to be saved.

COSTS/LOSS	**INCOME/GAINS**
1 where extra costs are to be incurred?	3 where extra income is to be earned
2 where presence income is to be given up or forgone	4 where existing/presence costs are to be served
Total Costs=	**Total income=**

MODULE 13 – AGRICULTURAL COOPERATIVES

1. **What is a definition of agricultural Cooperatives?**
A cooperative is an organization that is formed for the common good. Farmers form cooperatives in order to facilitate production and market their products.

2. **Describe how an important decision that affects the running of a cooperative is taken by members.**
>A cooperative is taken by members.
>A cooperative should be legally constituted with guiding rules/regulations.
>Participation is voluntary. People are free to join or leave.
>Cooperatives are impartial and not to all farming community members who share a common interest.
>Cooperative are organized and run according on democratic principles (one person one vote).
>A committee of up to ten members (consisting of the chairperson, secretary, treasurer and committee members) is elected and charged with the responsibility of running the affairs of the society. The committee is democratically elected and the election of members is based on trust and quality leadership skills.

3. What factors contribute to a cooperative success?

- The staff and committee members running and controlling the organization five the necessary expertise and are trustworthy.
- The cooperative has enough capital/funds.
- The cooperative is efficiently and effectively organized.
- Staff members managing the funds are skilled, trustworthy and tightly motivated.
- All members are committed to the cooperatives and its success.
- The organization should have adequate infrastructure such as staff houses, offices, storage facilities, personnel, transport, equipment and supplies.
- Members of the cooperative receive on going and relevant training to improve their productivity and marketing skills.

MODULE 14 – FARM MECHANISATION

1. What is Farm Mechanization?

Farm Mechanization involves the use of machines and appropriate technology to improve agricultural production.

2. Give five reasons why it is important to mechanize the farm in Malawi

1. Farm operations are done faster and at the right time. This allows farmers to prepare the land, plant and harvest in good time.
2. Farm mechanization makes the work easier.
3. Farmers mechanization leads to increased production (thus increased crop and livestock yields)
4. Mechanization releases farmer's time for other tasks.

3. Describe the limitations of farm mechanization.

1. Capital and operating costs are high.
2. Availability of tractors and spare parts when are all imported.
3. Skills to operate and maintain the machines might not be available.
4. The topography of the area might not be good.
5. Arable land might not be large and not available.

4. What are some of the factors that should be considered when mechanizing a farm?

1. Size of the farm holding.
2. Accessibility of the land
3. Topography of the land.
4. Availability of capital.
5. Technical know-how.
6. Value of the crop
7. Market demand

5. List the types of farm implements and machinery that can be used for primary and secondary tillage.

	Implement	**Use**
1.	Plough	Mostly for ploughing and tilling.
2.	Harrow	for breaking down the clods and leveling the land and incorporating manure into the soil.
3.	Ridges	for making ridges.
4.	Cultivator	for weeding.
5.	Hoe	for tilling.

6. Describe how you could maintain the following farm implements

Implement	**Maintenance**
A sprayer	Clean the tank often use. Dismantle and clean the nozzle Replace piston cups and worn out nozzle. Paint the knapsack.

A ridger	
A hoe	Check if the handle is not broken and the blade is not blant
An oxcart	scrap soil and apply used oil to blade.

7. What advantages does a disc plough have over a mould board plough?

The disc plough is idea for tropical conditions because it is able to roll over objects or obstacles such as rocks and stamps.

The mould board plough easily breaks if the field to rocks and stumps.

MODULE 15: REPORT WRITING FOR AGRICULTURAL EXPERIMENTS.

1. Why is it necessary to report experiments?

It is important to report agricultural experiments in order to communicate with other scientists, to tell others such as farmers the recommended actions and the demonstrated evidence or merely to keep documented record of results.

i. To communicate results to farmers or scientists.
ii. To tell farmers the recommended actions.
iii. To tell farmers the demonstrated evidence.
iv. To keep documents record of results.

2. Outline the format for reporting experiments

i. Title of the experiment.
ii. Introduction
iii. Aim or objectives.
iv. Materials and methods used.
v. Design of the experiment.
vi. Data collection.
vii. Results.
viii. Discussion or interpretation of results.
ix. Conclusions and recommendations.

3. Explain my three aspects you would report under each of the following headings.

1. Methods used – Choice of treatments.
   - Design of the experiment
   - Husbandry practices.

2. Data Collection
   - Description of each observation
   - Numerical information
   - Diagrams with brief explanation of main issues observed,

3. Interpretation of results
   - Observations
   - Measurement
   - Reason of each case observed.

4. Conclusion
   - Findings
   - Results.

- Best treatment
- Description of its performance

4. Why would you consider each of the following when writing a report on experiment

i. Adopting a scientific attitude
- Emphasizing facts rather thou personalizing them. Avoid using personal nouns such as I, we, our, us.
- Use the third person passive voice

ii. Expressing facts accurately
- Avoid use of vague words
- Avoid technical jargon.
- Use simple and familiar words

iii. Using graphic aids
- To present information is a pictorial vow in order to compare or to understand easily

MODULE 16 – LAND DEGRADATION AND THE ECONOMY

1. **Describe the extent of land degradation in Malawi.**
Deforestation, cultivation of marginal land (along the river banks) and overstocking and overgrazing result in soil erosion, a major land degradation problem in Malawi.

The effects of soil erosion include reduced infiltration resulting in a lot of runoff of water and lowering of water tables, loss of top soil, loss of plant nutrients, sedimentation and silting of streams and rivers, lakes and dams, creation of deep gullies, flooding, desertification leading to the formation of dust storms, low pasture recovery and poor sward composition.

2. What are the effects of land degradation on the economy of Malawi?

Agriculture production in Malawi is possible because the country is endowed with natural resources such as land, soil, water and forest. However, land that is suitable for farming is becoming increasingly scarce and expensive in Malawi for the following reasons:-

i) As the human population increases, demand for land also increases this makes the land expensive to own
ii) As more land is cultivated less land is left to animal grazing and forest reserves.
iii) The land is becoming less productive due to soil erosion and loss of fertility.
iv) Gullies formed due to erosion take up some land, which could be used for farming as it is expensive to reclaim the land that has bee degraded.
v) The practice of growing crops on the same piece of land leads to soil exhaustion. The exhausted soil requires a lot of fertilizers, which is expensive.

MODULE 17 – POPULATION GROWTH AND FOOD SECURITY

1. State any five agricultural technologies, which ensure food security.

i) Plant and animal breeding – Resulting in high yielding crops and livestock breeding
ii) Irrigation – Ensure efficient utilization of water for crop production and overcome

drought and crops an be grown during dry season.

iii) Fertilizer Development – These enrich soil fertility and increase crop yields.
iv) Pesticide Development / Herbicide Development – Control pests and diseases
v) Food Storage and preservation – minimizes wastage from pest and moulds. Food is kept for a longer time and for future use.
vi) Mechanization – Farming operations are completed in time and ensure higher yields
vii) Crop Breeding technologies – Disease resistant crop varieties are bred and made available to farmers.

2. Name any three drought resistant crops grown in Malawi

i) Cassava
ii) Millet
iii) Sorghum
iv) Sweet potatoes
v) Yams

2. **How do these drought resistant crops ensure food security for the growing population?**

This is made possible through their adaptation to:-

i) Drought conditions
ii) Early maturing
iii) Ease of storage.

4. Why is it important to grow drought resistant crops for food security?
It is important to grow drought resistant crops for food security because they ensure food supply in time of drought.

MODULE 18 – POPULATION AND LAND POLICY IN AGRICULTURE

1. What is land tenure?

Land tenure refers to the way in which land is owned or used.

2. Name three systems of land tenure in Malawi
i) Public tenure
ii) Communal / Customary tenure
iii) Private (freehold, leasehold) tenure

3. Which system of land tenure is most useful in promoting national development?

4. State any difference between freehold and leasehold land.

- Freehold land is land the farmer owns and can use it in any way he/she wants without paying rent while.
- Leasehold land is land held for fixed period of time (99 years) for a specific purpose for a fee, which is rent, paid annually.

5. Supply three reasons why equitable land distribution is important for Malawi's growing population.

i) To ensure that farmers have enough land to grow food crops.
ii) To ensure that idle land is distributed to those who do not have land.
iii) To ensure that families will be food secure

6. What are the three main provisions in Malawi land distribution policy?

i) Traditional Chiefs to distribute customary land to the people to ensure that every member of the village community has land to grow crops.
ii) The government through Department of Lands and Physical Planning to lease land to commercial farmers in a leasehold tenure.
iii) The government to buy back idle land from large estates and redistribute it to needy and able farmers.

7. What is the relationship between the population policy and the agricultural policy in Malawi?

The population policy aims at reducing the population pressure on the land and to increase production by practicing recommended methods of crop and livestock production in order to produce more crop and livestock of better quality per unit area of land.

8. How do the population and agriculture policies promote natural development?

The population and agricultural policies in Malawi play important roles in National Development by:-

i) Guide in planning
ii) Guide distribution of agricultural and other services.
iii) Ensure that agriculture resources, especially land, are conserved and not too degraded by a rapid growing population.
iv) Ensure that population growth matches the availability or capacity of the land to support it.

MODULE 19 - AGRO BASED INDUSTRIES

1. What does the term "Agro Industry" mean?
   Agro-based industries are farms or companies that use raw materials from agriculture or produce inputs for agriculture.

2. Name any three agro-based industries in Malawi

AGRO-BASED INDUSTRY	INPUTS
i) Agrimal (Malawi) Ltd	Produce or make agriculture tools such as Ridgers, ploughs, cultivators, tobacco Presses, hoes and pangas
ii) OPTICHEM (2000) Ltd	Manufacturers of Compound NPK fertilizers 23-21:0+43, Super D Compound, and import Urea, CAN into the country.

AGRO-BASED INDUSTRY	INPUTS

iii) Pannar Seed (Mw) Ltd Produces and supplies hybrid maize Seeds and vegetable seeds.

2. **How does each of these agro-based industries support the growing population?**

i) Equipping farmers with inputs
ii) Processing raw materials
iii) Providing a market for Agricultural products
iv) Feeding and clothing the nation
v) Providing employment – Agro Industries, Lever Brothers, Grain & Milling, Illovo Sugar, Cold Storage, and Optichem.

MODULE 20 – GENDER AND AGRICULTURAL DEVELOPMENT

1. State any four decisions farmers have to make in agricultural development.

i) What to produce (Enterprise)
ii) How to produce (Technologies)
iii) How much to produce (size of production
iv) When and where to sell or buy (marketing decisions)

2. How do you rate the involvement of female farmers in decision making in Malawi?
The discussions are often biased towards male members of the family – males have to be consulted before the final decision can be made.

3. List any three factors that limit the involvement of female farmers in decision making in agriculture

- Women have low social status
- Women are often under-represented in decision-making positions in farming communities
- Women can not own land but can only use it under patriniel family,
- Malawi Traditional cultures value women to be submissive and play subordinate roles to those of men.

4. State any four ways of improving the involvement of female farmers in decision-making for agricultural development.

- Social empowerment
- Political empowerment
- Economic empowerment
- Cultural empowerment.

MODULE 21- - HIVE/AIDS AND AGRICULTURAL DEVELOPMENT

1. Which age group is most infected by HIV/AIDS?

The most infected age group is 30 – 34 years. This affects agricultural development

because the infected is the most productive age group. Nothing can reduce agricultural development faster than eliminating the very people who cultivate the land.

i) Weakening the labour force
ii) Taking time away from farming
iii) Killing the most productive farmers in the population
iv) Depleting farm capital
v) Disturbing the emotional balance of the farmer.

THE END

AND

GOOD LUCK!