**S S 2 AGRICULTURAL SCIENCE**

**FIRST TERM**

**WEEK 1 AND 2**

**WEED**

Weed is any plant that grows in a place where it is not expected to grow or a plant which grows out of place. Weed can also be defined as a plant that grows where it is not desired in such a way that it constitutes nuisance either to human, livestock or crops

All farmers have to work hard to prevent their crops from being invaded by weed. Losses in crop yield due to weeds may be greater than those due to plant pest and diseases. If a farmer fails to control weed growth, the chances of successful crop production are seriously reduced.

EFFECTS/ECONOMIC IMPORTANCE OF WEEDS

The harm done by wed is due mainly to their competition with crops. The effects or economic importance of weeds include

1. Weeds compete with crops for space: when a young plant is developing, weeds rapidly crowd and smother the crop and the space needed for healthy is reduced.
2. Weeds compete crops for sunlight: weeds are capable of producing many large leaves which shade crops seedlings and therefore reduce the amount of sunlight which is available for photosynthesis.
3. Weeds compete with crops for Nutrients: the root of weeds rapidly develop and remove considerable proportion of the available plant nutrients thereby reducing the healthy growth of the plants.
4. Weeds harbor Crop Pest and Diseases: some weeds may have habour crop pest and diseases by acting as a host, i.e. providing the insect food when crops are not available.
5. Weeds compete with crops for soil moisture: their root is capable of developing fast and removing a large portion of the soil moisture required for the normal growth of the plant.
6. Losses in crop yield : the combined competition of weed and crops eventually will result in low yield.
7. Weeds compete with crops for soil Oxygen: weeds are capable of developing long root which remove considerable amount of oxygen required for crop root respiration .
8. Losses in quality of crops : the quality of harvested crops will reduce and this will affect market values of such crops .
9. Losses in income of the farmer : the low yield coupled with the reduction in the quality of produce , and increase in the cost of controlling the weeds consequently leads to losses in the income of the farmer .
10. Reduction in the palatability of some grasses : weeds also invade pastures ,reducing the palatability of useful grasses.
11. Some weeds are toxic to farm animals : the leaves and stem of some weeds contain toxins which may be dangerous to farm animals .

However some weeds are still useful to the farmer in the following ways :

1. Some weeds can acts as cover crops
2. Some are used as forage grasses and legumes for feeding farm animals
3. Some are used to prepare compost mad green manure
4. Some weeds can help to control soil erosion

Characteristics and growth habit of selected weeds

Weeds often possess characteristics which increase their growth habit and mode of dispersal. Factors which aid the growth habits of weeds include :

1. Production of large quality of seeds
2. Some weeds reproduce by seeds
3. Some weeds reproduce by vegetation propagation
4. Growth of large leaves within a short time
5. Weeds growth is favoured during the rainy season
6. Most weeds are wind-pollinated
7. Production of large quantities of pollen grains

Dispersal of weeds seeds and fruits

Most seeds and fruits of weeds are generally dispersed by wind and animals.

Mode of Dispersal of weeds includes :

1. Dispersal of seeds by winds
2. Dispersal of seeds by animals
3. Dispersal of seeds by water
4. Dispersal of seeds by explosive mechanism

Common /types of weeds found on the farmland

|  |  |
| --- | --- |
| Common Names | Botanical Names |
| Guinea grass | Panicum maximum |
| Bahama grass  | Cynodon dactylon |
| Carpet grass | Axonopus compressus |
| Sensitive plant | Mimosa pundica |
|  Spear grass | Imperiata cylindrical |
| Wire grass | Aspilia africana  |
| Centro | Centrosema pubescens |
| Blue feather | Commenlina nudiflora |
| Stubborn grass  | Eleucine indica |
| Stubborn weed | Sida acuta |
| Goat weed  | Ageratum conizoids |
| Elephant grass | Penisetum purpureum |
| Giant star grass | Cynodon plactostachynum |
| Pig weed | Boerhavia diffusa |
| Bush green  | Amaranthus spinosus |
| Water leaf | Talinum triangulare |
| Sedge plant | Cyperus rotandus |
| Tridax  | Tridax procumbens |
| Calopo | Calopogonium mucunoides |
| Northern gamba | Andropogon gayanus |
| Sun hemp | Crotalaria juncea |
| Mucuna  | Mucuna utilis  |
| Stylo | Stylosanthes gracilis |
| Southern gamba | Andropogon tectorum |
| Kudzu or puero | Pueraria phaseoloides |

General control of weeds, grasses and legumes

Weeds can be controlled through a number of methods

1. Mechanical /physical method : the mechanical methods of controlling weeds are :

 Hand pulling /hand picking: this involves uprooting of weeds from the soil by hand.

Hoeing : this involves uprooting weeds from the soil by using hoe

Slashing : through this method, the Arial part of the weeds are removed with cutlass leaving behind the root in the soil

Rotary cultivation: this involves using hand drawn implements to undertake the ploughing and burying of weeds.

1. Biological control : this involves the introduction of some insects and herbivores animals to farmland to eat up the leaves of these weeds
2. Cultural control: this involves the practice of crop rotation and the growth of cover crops to suppress the growth of weeds on the farmland.

The cultural methods of weed control are

Flooding

Burning

Mulching

Cover cropping

Crop rotation

1. Chemical control: this involves the use of chemical solutions called herbicides to control the growth of weeds.

Questions1,What is weed?

 2,State five examples of weeds and their botanical name.

 3.State two methods of weeds control

WEEK 3-4

CROP IMPROVEMENT

Crop Improvement refers to the ways of developing and breeding of crop varieties which are better than the existing varieties in a number of characters

Aims of Crop improvement

The breeders involves in improving our crops usually have certain aims in mind when doing their work. These aims include:

1. To increase Yield: the varieties of crops so-developed by breeders are capable of giving very high yield or quantity of crop per unit of the land.
2. To improve the quality of produce: the quality of farm produce enhances its usefulness and value. Plant breeders can improve on the taste, colour, size, nutritive value and fiber content of crops.
3. To adapt to climatic condition : plant breeders develop varieties of crops that are able to withstand extreme condition of cold ,drought, and wind by adjusting the growth cycle of the variety better to suit the available growing season
4. To increase resistance to diseases: they could also develop varieties of crops which are not only resistant to diseases but produce high yield in the presence of diseases.
5. To meet the power of growers : improvements in farming methods may particular characteristics desirable to growers in their plants
6. To obtain uniformity of plants: one of the aims is to breed crops which can grow and mature uniformly to facilitate mechanism or ease of harvesting.
7. To breed crops with early maturity: also to produce crops which will mature early.
8. To improve harvesting qualities: breeders try to produce crops that can be harvested with ease and without damaging to the seeds/fruits.
9. To improve the nutritional value of the produce: also to develop crops that have nutritional value like high protein, mineral vitamins, etc. which are useful to man.
10. To meet the needs of consumers (processors or industrialists): the demand by food processors as well as other consumers creates pressure for new quality of plants.

MENDELIAN LAWS OF INHERITANCE

To understand the mendelian laws the following terms need to be understood

1. Character or Traits: these are the inherited attributes which the plant breeders select. E.g. seed colour , seed size , plant height , disease resistance etc.
2. Chromosomes: these are the rods or thread shaped bodies found in the nucleus of a cell. The chromosomes houses or contains the genes .
3. Gene: these are hereditary units or units of inheritance.
4. Gamete: this is a mature sex cell which takes part in sexual reproduction. There are two types of male gamete or spermatozoa (in animals) and pollen grains (in plants) and female gamete or egg or ovum (in animals) and ovules (in plants). Gamete is usually Haploid
5. Zygote: is a single cell formed as a result of union of a male gamete with a female gamete.
6. Allelomorphs : these are pairs of genes on the position of a chromosome (i.e. locus) that control contrasting characters.
7. Phenotype : these are the physical and physiologically expressed traits of an individuals e.g. height
8. Genotype: this is a term used to describe those traits or sum total of the genes inherited from both parent.
9. Dominant Character: this is the character shown in an individual without any significant influence of the contrasting characters present in the same individual on the dominant character.
10. Recessive character: this is unexpressed character in the presence of a dominant character in an individual.
11. Homozygous: a plant is said to be homozygous if the two members of a pair of genes controlling a given pair of contrasting characters are identical.
12. Backcross : is a cross between an offspring and one of the parents
13. Heterogeneous : a plant is said to be heterogeneous if the two members of a pair of genes controlling a given pair of contrasting characters are different e.g. (Tt) for tallness
14. Hybrid: this is the offspring got from crossbreeding two pure varieties of any species.
15. Filia generation: the offspring of parents make up the filia generation.

Mendel’s laws of inheritance are in two forms

Mendel’s 1st law of segregation of genes : this states that genes are responsible for the development of the individual and that they are independently transmitted from one generation to another without undergoing any alteration

Mendel’s 2nd law of independent assortment of genes : states that each character behaves as a separate unit and is inherited independently of any other character

Process of crop improvement

The process of crop improvement includes

1. Introduction
2. Selection
3. Breeding or Hybridization

Introduction

This involves the importation of introduction or some varieties of crop with desirable characteristics into area where they have not existed before.

Advantages of introduction

1. It helps to introduce new varieties of crops to a new area
2. It may enhance greater productivity
3. It may perform better if there is better climatic condition in the new location
4. It may also perform better if there is better soil condition in the new area
5. Absence of pests and diseases
6. It helps to upgrade the quality of the local varieties of crops

Disadvantages of introduction

1. There is the possibility of introducing new crop diseases
2. The new crop may not be able to adapt to climatic condition of the new location
3. It also introduce new pests to the new environment
4. The introduced crop may not be able to adapt to soil conditions of the condition

Selection

This involves the artificial picking of crops with desirable characteristic which are most favoured by the environment.

Method of selection includes:

1. Mass selection : crops are selected or rejected on the basis of their own performance or merits
2. Pure line selection : only one crop plant with good character
3. Pedigree selection : crops are selected on the basis of the performance of their ancestors.
4. Progeny selection: crop plants are selected on the basis of the performance of their offspring of progeny.

Advantages of selection

1. It ensures that only the best naturally available crop is grown
2. Crops with desired qualities are selected
3. Seeds from best stands are multiplied for distribution
4. Crops with undesirable characters are detected and rejected.
5. It reduces the spread of diseases and pests

Disadvantages of selection

1. Selection is tedious and time consuming
2. It is very expensive in terms of time and money.
3. It requires expertise which may not be available.
4. It brings about the elimination of some desirable traits f the parent stock.

Breeding or hybridization

Hybridization is a method by which an offspring is produced through the crossing of two different plant varieties of the same species.

Types of breeding

1. In-breeding: this is pollination and fertilization of closely related crop plants in order to retain certain desirable characteristics. This can lead to pure breed or pure line.
2. Cross breeding: this is the pollination and fertilization of unrelated crop plants belonging to different breeds. This results in the production of an offspring which is superior to the average performance of the parents. This is called Hybrid vigour “heterosis”.

Advantages of breeding

1. It can produce a superior offspring resulting in hybrid vigour or heterosis ( cross breeding )
2. Progeny grows more rapidly (cross breeding).
3. Production of pure-line (in breeding).
4. Offspring can withstand variations of environment (cross breeding).

Disadvantages of breeding

1. It could lead to “inbreeding depression”. Which is the depression of loss in vigour and performance of offspring (in breeding ).
2. There is a drop in production or yield of crops in terms of quantity and quality (in breeding)
3. It may lead to poor or low resistance to disease attack (in-breeding).

Methods of improving Crop Productivity

 Productivity of crops can be achieved through a combination of methods which includes :

1. Crop improvement methods: crops ca n be improves through introduction, selection and hybridization.
2. Proper timing of planting: crops should be grown at the right time to avoid high temperature, inadequate rainfall or abundance of pests and diseases during growth.
3. Adoption of better cultivation methods: such as crop rotation which adds nutrients to the soil, prevent erosion, pests and diseases outbreak and helps to increase yield.
4. Use of manures and fertilizers: the use of manure like farm yard, compost and green manure in combination with the use of fertilizers helps to add nutrients to soil and promotes good growth of crops.
5. Control of pests of crops: the control of pests of crops which cause reduction in yield and growth can help in the improvement of crops.
6. Control of diseases of crops
7. Use of resistance varieties: some varieties of crops are capable of resisting disease’s attack and can mature early; thereby by increasing the yield of crops.
8. Use of good crop varieties: there are some varieties of crops which naturally will grow well in different environmental conditions.

Questions1.What is crop improment

 2.State two methods of cropimproment.

 3.State five importance crop improment,

**WEEK 5-6**

What is 'Demand?'

Demand is an economic principle that describes a consumer's desire and willingness to pay a price for a specific good or service. Holding all other factors constant, an increase in the price of a good or service will decrease demand, and vice versa.

Law of Demand

The law of demand states that when the price of a good rises, the amount demanded falls, and when the price falls, the amount demanded rises.

Demand Schedule

Demand schedule is a table that lists the quantity of a good all consumers in a market will buy at every different price. A market demand schedule for a product indicates that there is an inverse relationship between price and quantity demanded.

|  |  |
| --- | --- |
| Price (N) | Quantity Demand (kg) |
| 100 | 10 |
| 80 | 20 |
| 60 | 30 |
| 40 | 40 |
| 20 | 50 |

Demand curve

This is a graph showing how the demand for a commodity or service varies with changes in its price.

Factors Affecting Demand

Even though the focus in economics is on the relationship between the price of a product and how much consumers are willing and able to buy, it is important to examine all of the factors that affect the demand for a good or service.

These factors include:

Price of the Product

There is an inverse (negative) relationship between the price of a product and the amount of that product consumers are willing and able to buy. Consumers want to buy more of a product at a low price and less of a product at a high price. This inverse relationship between price and the amount consumers are willing and able to buy is often referred to as The Law of Demand.

The Consumer's Income

The effect that income has on the amount of a product that consumers are willing and able to buy depends on the type of good we're talking about. For most goods, there is a positive (direct) relationship between a consumer's income and the amount of the good that one is willing and able to buy. In other words, for these goods when income rises the demand for the product will increase; when income falls, the demand for the product will decrease. We call these types of goods normal goods.

However, for some goods the effect of a change in income is the reverse. For example, think about a low-quality (high fat-content) ground beef. You might buy this while you are a student, because it is inexpensive relative to other types of meat. But if your income increases enough, you might decide to stop buying this type of meat and instead buy leaner cuts of ground beef, or even give up ground beef entirely in favor of beef tenderloin. If this were the case (that as your income went up, you were willing to buy less high-fat ground beef), there would be an inverse relationship between your income and your demand for this type of meat. We call this type of good an inferior good. There are two important things to keep in mind about inferior goods. They are not necessarily low-quality goods. The term inferior (as we use it in economics) just means that there is an inverse relationship between one's income and the demand for that good. Also, whether a good is normal or inferior may be different from person to person. A product may be a normal good for you, but an inferior good for another person.

The Price of Related Goods

As with income, the effect that this has on the amount that one is willing and able to buy depends on the type of good we're talking about. Think about two goods that are typically consumed together. For example, bagels and cream cheese. We call these types of goods compliments. If the price of a bagel goes up, the Law of Demand tells us that we will be willing/able to buy fewer bagels. But if we want fewer bagels, we will also want to use less cream cheese (since we typically use them together). Therefore, an increase in the price of bagels means we want to purchase less cream cheese. We can summarize this by saying that when two goods are complements, there is an inverse relationship between the price of one good and the demand for the other good.

On the other hand, some goods are considered to be substitutes for one another: you don't consume both of them together, but instead choose to consume one or the other. For example, for some people Coke and Pepsi are substitutes (as with inferior goods, what is a substitute good for one person may not be a substitute for another person). If the price of Coke increases, this may make Pepsi relatively more attractive. The Law of Demand tells us that fewer people will buy Coke; some of these people may decide to switch to Pepsi instead, therefore increasing the amount of Pepsi that people are willing and able to buy. We summarize this by saying that when two goods are substitutes, there is a positive relationship between the price of one good and the demand for the other good.

The Tastes and Preferences of Consumers

This is a less tangible item that still can have a big impact on demand. There are all kinds of things that can change one's tastes or preferences that cause people to want to buy more or less of a product. For example, if a celebrity endorses a new product, this may increase the demand for a product. On the other hand, if a new health study comes out saying something is bad for your health, this may decrease the demand for the product. Another example is that a person may have a higher demand for an umbrella on a rainy day than on a sunny day.

The Consumer's Expectations

It doesn't just matter what is currently going on - one's expectations for the future can also affect how much of a product one is willing and able to buy. For example, if you hear that Apple will soon introduce a new iPod that has more memory and longer battery life, you (and other consumers) may decide to wait to buy an iPod until the new product comes out. When people decide to wait, they are decreasing the current demand for iPods because of what they expect to happen in the future. Similarly, if you expect the price of gasoline to go up tomorrow, you may fill up your car with gas now. So your demand for gas today increased because of what you expect to happen tomorrow

The Number of Consumers in the Market

As more or fewer consumers enter the market this has a direct effect on the amount of a product that consumers (in general) are willing and able to buy. For example, a pizza shop located near a University will have more demand and thus higher sales during the fall and spring semesters. In the summers, when less students are taking classes, the demand for their product will decrease because the number of consumers in the area has significantly decreased.

What is 'Demand Elasticity?'

Demand elasticity, in economics, refers to how sensitive the demand for a good is to changes in other economic variables. Demand elasticity is important because it helps firms model the potential change in demand due to changes in price of the good, the effect of changes in prices of other goods and many other important market factors. A firm grasp of demand elasticity helps to guide firms toward more optimal competitive behavior. Elasticity greater than one are called "elastic," elasticities less than one are "inelastic," and elasticity equal to one are "unit elastic."

What is 'Price Elasticity Of Demand'

Price elasticity of demand is a measure of the relationship between a change in the quantity demanded of a particular good and a change in its price. Price elasticity of demand is a term in economics often used when discussing price sensitivity. The formula for calculating price elasticity of demand is:

Price Elasticity of Demand = % Change in Quantity Demanded / % Change in Price

If a small change in price is accompanied by a large change in quantity demanded, the product is said to be elastic (or responsive to price changes). Conversely, a product is inelastic if a large change in price is accompanied by a small amount of change in quantity demanded.

1. Perfectly Elastic Demand:

When a small change in price of a product causes a major change in its demand, it is said to be perfectly elastic demand. In perfectly elastic demand, a small rise in price results in fall in demand to zero, while a small fall in price causes increase in demand to infinity. In such a case, the demand is perfectly elastic or ep = 00.

The degree of elasticity of demand helps in defining the shape and slope of a demand curve. Thuuerefore, the elasticity of demand can be determined by the slope of the demand curve. Flatter the slope of the demand curve, higher the elasticity of demand.

Though, perfectly elastic demand is a theoretical concept and cannot be applied in the real situation. However, it can be applied in cases, such as perfectly competitive market and homogeneity products. In such cases, the demand for a product of an organization is assumed to be perfectly elastic.

From an organization’s point of view, in a perfectly elastic demand situation, the organization can sell as much as much as it wants as consumers are ready to purchase a large quantity of product. However, a slight increase in price would stop the demand.

2. Perfectly Inelastic Demand:

A perfectly inelastic demand is one when there is no change produced in the demand of a product with change in its price. The numerical value for perfectly inelastic demand is zero (ep=0).

Demand remains constant for any value of price. Perfectly inelastic demand is a theoretical concept and cannot be applied in a practical situation. However, in case of essential goods, such as salt, the demand does not change with change in price. Therefore, the demand for essential goods is perfectly inelastic.

3. Relatively Elastic Demand:

Relatively elastic demand refers to the demand when the proportionate change produced in demand is greater than the proportionate change in price of a product. The numerical value of relatively elastic demand ranges between one to infinity.

Mathematically, relatively elastic demand is known as more than unit elastic demand (ep>1). For example, if the price of a product increases by 20% and the demand of the product decreases by 25%, then the demand would be relatively elastic.

4. Relatively Inelastic Demand:

Relatively inelastic demand is one when the percentage change produced in demand is less than the percentage change in the price of a product. For example, if the price of a product increases by 30% and the demand for the product decreases only by 10%, then the demand would be called relatively inelastic. The numerical value of relatively elastic demand ranges between zero to one (ep<1). Marshall has termed relatively inelastic demand as elasticity being less than unity.

5. Unitary Elastic Demand:

When the proportionate change in demand produces the same change in the price of the product, the demand is referred as unitary elastic demand. The numerical value for unitary elastic demand is equal to one (ep=1).

Supply

Supply may be defined as the quantity of commodity which a producer is willing and able to offer for sale at a given price over a particular period of time.

The quantity of commodity offered for sale in the market is known as Effective supply.

Law of Supply

The law of supply states that the higher the price , the higher the quantity of produce that will be supplied or the lower the price the lower the quantity of produce that will be offered for sale.

Supply schedule

Supply scheduled is a table which shows the relationship between price and quantity of commodity supplied. It shows the quantity of goods that can be supplied as the price of goods change.

Supply Curve

Supply curve, in economics, graphic representation of the relationship between product price and quantity of product that a seller is willing and able to supply. Product price is measured on the vertical axis of the graph and quantity of product supplied on the horizontal axis.

1. Change in the cost of production

2. An increase in the number of producers will cause an increase in supply

3. Expansion in capacity of existing firms, e.g. building a new factory

4. An increase in supply of a related good e.g. beef and leather

5. Climatic conditions are very important for agricultural products

6. Improvements in technology, e.g. computers, reducing firms costs

7. Lower taxes reduce the cost of goods

8. Increase in government subsidies will also reduce cost of goods

Price elasticity of supply (PES) measures the responsiveness of quantity supplied to a change in price. It is necessary for a firm to know how quickly, and effectively, it can respond to changing market conditions, especially to price changes. The following equation can be used to calculate PES.

The elasticity of supply measures the responsiveness of the quantity supplied to a change in the price of a good, with all other factors remaining the same.

Implications of demand and supply on agricultural production

1. When demand is lower than supply , the price of the produce will fall and farmers will be discouraged from further production
2. When demand exceed supply ,price would tend to rise and farmers would be stimulate to produce more
3. Higher supply of agricultural products may lead to reduction in price and demand
4. high cost of a product may lead to low demand and high demand for its substitute
5. High taste of agricultural products by consumers will lead to high demand for such products
6. Increase in the income of consumers may lead to increase in the demand agricultural products and vice versa
7. high cost of production may lead to low supply and high prices of products and vice versa
8. High cost and lack of farm input may lead to low supply and high cost of farm products and vice versa
9. Favourable weather and climate for production will lead to high supply of farm products and vice versa
10. increase in the numbers of farmers will lead to higher supply and reduction in the price of food,and vice versa

Law Of Diminishing Returns

A concept in economics that if one factor of production (number of workers, for example) is increased while other factors (machines and workspace, for example) are held constant, the output per unit of the variable factor will eventually diminish.

Although the marginal productivity of the workforce decreases as output increases, diminishing returns do not mean negative returns until (in this example) the number of workers exceeds the available machines or workspace. In everyday experience, this law is expressed as "the gain is not worth the pain.

Importance Of Law Of Diminishing Returns In Agriculture

1. It helps the entrepreneurs to determine the best proportion to combine the various factors of production
2. It also enables him to know when to stop adding more input of the variable factors to a fixed factors
3. It also enables him to determine the wages he will pay to his workers
4. It enables him to minimize cost and avoid wastage of resources in order to make more profits.

**Questions1,What is demand?**

 **2.State the laws of demand.**

 **3.What is supply.**

 **4.What is demand curve,**

**WEEK 7-8**

FARM ACCOUNTS

 Farm account are statements of money paid out or received for goods and services used in a farming business.

FARM RECORDS

Farm records are written documents showing major activiyies goimg on in the farming business. To enable farmer to manage his farm very well ,he must keep some records

Importance Of Farm Records And Accounts

1. Changes in prices of produces : enables farmers to monitor the changes in the price of produce bought or sold by the farm
2. It show the financial position of the farm
3. Whether profit or loss is made
4. Detection of fraudulent practices
5. For taking management decisions
6. For procurement of loans
7. Determination of annual tax
8. Determination of actual worth of the farm
9. For comparing management efficiency
10. Farm auditing
11. Data for planning and budgeting

Types of farm records and account

Farm records which a good farmer should keep are

1. The cash book receipt and payment record
2. Annual valuation
3. Farm diary
4. Farm inventory
5. Yield and production records
6. Payroll or labour record
7. Farm input utilization record
8. Profit and loss account

Types Of Farm Accounts

1. Sales account : this is also known as sales and receipt account
2. Purchase account
3. Farm valuation
4. Cash analysis account
5. Farm income statement
6. Balance sheet or Net worth statement

Definition Of Some Accounting Terms

1. Farm asset: is anything of value n the possession of a farm business. Assets are grouped into two classes

Fixed assets: these are assets which are not used up during production. Example, landed property ,farm buildings

Current assets: these are assets which are used up during production . Examples, water, feed, drugs , fertilizers etc.

1. Liabilities : is the money owned to external persons or corporate bodies e.g. loan from banks

Liabilities are grouped into two classes

* 1. Current or short term liabilities : they are debts that must be paid within one accounting year e.g. creditor’s loan
	2. Long term liabilities : there are debts which cannot paid back within one e.g. long term loans from banks
	3. Net capital, Net worth or owner’s Equity: this is the total money supplied by the owner of the business.

Assets – liabilities = owner’s equity

1. Liquidity: is the ability of the farm business to meet its financial commitment as they fall due.
2. Solvency: this is the ability of the farm business to cover the liquidation of the asset.
3. Appreciation: refers to increase in value of worth of an asset as the asset is being used over time.
4. Depreciation: this refers to decrease or loss or reduction in value in the value or worth of an asset as the asset is being used over time.
5. Salvage value: this is the amount at which an asset is sold off when it is no longer economical to keep or when the cost of maintenance of the asset is too low.
6. Useful life of an asset: this means the number of years a piece of farm equipment can effectively serve a farmer.

 Calculation of depreciation and Salvage value

There is relationship between depreciation and salvage value of fixed assets.

Methods of calculating depreciation of farm machines

1. Straight line method or fixed installment method
2. Annual revaluation method
3. Unit of production or output method
4. Declining/reducing balance method
5. Sum-of-the-years-digits method

Formulae for Calculating Depreciation

Total depreciation = cost of asset – salvage value of the asset

Annual depreciation = cost price-salvage value

No. of years in use

 CP- SV

 Lifespan (yrs)

**Questions1.What is farm record?**

 **2.What is farm account?**

 **3.State five types of farm record.**

 **4.Explain five importance of farm record.**

**WEEK 9-10**

Animal Nutrition

The food given to farm animals is generally known as livestock feed of simply feed. Animals need feeds for growth repair of worn out tissues, energy and the general well being of the animals.

Effects of feed shortage in animal production

Feed shortage will lead to the following effects in the animal production

Loss of weight or low birth weight

Poor reproduction or delay in puberty or late maturity

Poor milk, meat and egg production is recorded

Could also lead to high death rate

Increase in susceptibility to diseases

Slow growth rate of livestock

Draft animals becomes weak and unable to work

Classification of livestock feed

1. Basal/energy feed of carbohydrate concentrate
2. Protein concentrate
3. Mineral / vitamins supplement
4. Roughages

BASAL FEED/ENERGY FEED

These are mostly easily digestible carbohydrates with low protein content. They constitute 60 to 90% of practical livestock rations.

They have low fibre content thus need to be supplemented by high protein feeds.

ROUGHAGES

Roughages are feeds that are rich in plant fibre. They can be prepared

in the following ways:

a. Hays: these are sun-dried forage packed and kept for feeding animals.

b. Silage: these are forage crops cut fresh, compressed in a pit and allowed to ferment.

c. Straw: this consists of dried plant materials as maintenance ration during periods of food scarcity.

d. Forage: this refers to grasses and legumes used for feeding farm animals.

e. Fodder: these are crops grown specially to feed farm animals, example: corn, groundnut, legumes, grasses, etc.

PROTEIN CONCENTRATE

Characteristics

1. It has crude fiber content less than 18 percent
2. It is high in protein
3. Low in carbohydrates and fats
4. Low in fibre
5. Highly digestible
6. Low in minerals

MINERAL AND VITAMINS SUPPLEMENTS

Characteristics

1. They are required in small quantity in the feed
2. They supplement basal and protein concentrate
3. Low in energy
4. Low in protein
5. Low in fibre
6. High in minerals and vitamins
7. They are necessary for growth and development
8. They largely aid food digestion
9. They largely aid resistance to diseases
10. They include minerals, vitamins and essential amino acids.

Methods of preparing feed ingredients

* + - 1. Blood meal: collect fresh blood from the abattoir and allow to clot in the open. Heat the blood to reduce the moisture content and kill the pathogens. After heating the blood now in lumps is dried and crushed into powder.
			2. Fish meal: fish meals can be prepared sin two major ways, these are :dry and wet processes.
				1. Dry process: collect fresh fish, sun-dry or smoke it to reduce the moisture content, and then ground it into powder.
				2. Wet process or Rendering: collect the fresh fish, heat it with steam, then, dry it and crush into powder.
			3. Groundnut / palm kernel cake: collect the seeds of groundnut /palm kernel, crush and press to remove the oil .then press the remnants with machine to form cakes, which are dried.
			4. Cotton seed meal: collect cotton seeds, grind them and extract oil from oil from the crushed. Dry the residue or cake later.
			5. Bone meal : this can be prepared in two ways :
				1. Dry process : collect bones from the abattoir , dry and burn them ,then crush the burnt bones to the desired textures
				2. Wet process or rendering: collect bones form the abattoir, heat with steam, crush and dry the crushed bones.
			6. Maize / Guinea corn: remove grains from the cobs, dry them and crush or grind to desired texture.

Feed ingredient can be prepared or process for animals by making into mash and pellets while some have to be cooked before it can be fed to the animals.

**Basics for Livestock Nutrition**

Introduction

The most important aspect in keeping livestock healthy and able to produce is a proper nutritious diet. Cattle belong to a class of animals called ruminants. This group also includes sheep and goats. Ruminants have a digestive system which allows them to efficiently digest and absorb most of their nutrients from forages. There are four compartments in the beginning of the digestive tract, one of which is called the rumen that contains near 50 gals of fluid and ingested forage. The rumen has a large population of microbes, mainly bacteria and some protozoa, which allows for the degradation of the fibrous material in forage. Much of the initial digestion of feed is done by microbes in the rumen. Sheep and goats are also ruminants, but the initial digestive tract compartments are of different proportions and configuration than cattle. They are often referred to as “small ruminants”. The horse is a non‐ruminant herbivore. These animals do not have a multi‐compartmented stomach as cattle do, but are able to consume and digest forage. The cecum and colon, parts of the large intestine, serve the somewhat same purpose for the horse that the rumen does for the cow. Llamas and alpacas are "pseudo‐ruminants" because they have three continuous compartments in the fore digestive tract instead of four like ruminants. Swine utilize different types of feed than ruminants, due to the differences in their digestive systems. Swine are monogastrics, meaning they only have one stomach which is similar to that of humans. Usually grains are the main part of a swine’s diet. They can eat a portion of their diet from pasture, although the forage from the pasture needs to be of high quality. The diet for livestock is usually referred to as a ration and a balanced ration is the amount of feed that will supply the proper type and proportions of nutrients needed for an animal to perform a specific purpose.

**The Six Basic Components of a Ration**

**Water** ‐ Water is often over looked but is the most critical component of any ration. It is essential in allowing most of the physiological functions in the body. Water has been a difficult nutrient to determine the actual requirement for many livestock primarily because water is usually provided free of choice. When water is limited in a ration, the dry matter intake is reduced and the correct amount of nutrients for the animal is restricted.

Functions of water

1. Water is provided for drinking purpose
2. It is used for metabolic and digestion of food
3. Water is also used for dipping / drenching animals against ectoparasites and endoparasites
4. Water equally used for washing or cleaning animals
5. It is used for cleaning floors ,pens or for sanitation purpose
6. Water is also used for milk and meat processing
7. Water is part of the body of any animal
8. It is used for maintenance of body temperature
9. Water is used for irrigation of pastures
10. Water is a constituent of milk, egg, and meat.

**Protein** – Protein is needed for the structuring of muscles, skin, hair and internal organs and is the only food source of nitrogen. Crude protein is the total protein content of a feed. Since proteins contain 16% nitrogen on average, knowing the total amount of nitrogen will determine an approximate amount of protein in the feed. Proteins are composed of amino acids and each protein has a variety of the 22 amino acids in different quantities. Many amino acids are synthesized in the body, but there are eight amino acids that are not synthesized and need to be provided in the ration. These are called essential amino acids. The digestion and absorption of amino acids and nitrogen is different in each species of livestock.

Functions of Protein

1. Protein are essential for growth of young ones
2. They are used for the repair of worn out tissues
3. They are used in the formation of gametes in reproduction
4. Meat, egg and milk production in livestock depend on the protein level in the animal.
5. They required in the production of enzymes and hormones in the body of livestock
6. Protein is essential for the sustenance of life
7. They are also necessary for flesh build up
8. Protein provides the raw materials for building protective covering such as hair
9. They are also used in the formation of digestive juice and other secretions of the intestine.
10. Proteins are equally useful in the production of of antibodies

**Energy** ‐ Energy allows the animal to do physical work. It also provides the ability to grow, lactate, reproduce, and enable other physiological functions such as feed digestion. Energy is not actually a nutrient but a total caloric value of a feed. There are several chemical, mechanical, and mathematical methods to determine feed energy values.  Some of these are called digestible energy, metabolizable energy, net energy, and total digestible nutrients. A total digestible nutrient (TDN) is the energy value most commonly used in simple rations. Each ingredient in a ration has a different digestible energy value and of those values there is a different amount of energy that is metabolized and used in the body.

**Fiber** – Crude fiber is an estimate of structural carbohydrates found in plants and grains. It has a varying amount of digestible material from high to low in cellulose and lignin respectively. Fiber limits the energy value of plants for monogastrics such as pigs, but the microbes in the digestive tracts of the other livestock species mentioned above are capable of utilizing the fiber which provides energy in the ration. Fiber also provides the necessary bulk in the digestive tract and regulates the time of passage of food. This helps to maintain a population of microorganisms which are critical for healthy digestion.

**Minerals** ‐ Minerals are very much needed for the physiology of structure, metabolic and immune functions in the animal. There are two classifications of minerals. **Macro minerals** (calcium, phosphorous, sodium, chlorine, magnesium, potassium, and sulfur) are those that are required in the most amounts in a ration compared to **minor minerals** (iron, copper, molybdenum, manganese, zinc, cobalt, iodine, and selenium, and others) which are needed in less amounts.

**Vitamins** ‐ Vitamins are similar to minerals in that they take part in many physiological functions, including coenzymes for metabolic functions and antioxidants, which are compounds that help prevent damage to cells. Vitamins are grouped into two categories, fat soluble and water soluble. Many of the important vitamins for forage eating animals are either synthesized by microbes in the digestive system, obtained from sunlight, or are stored in the liver. Many of those vitamins that are not made in the animal are easily provided in adequate amounts in the forage.

**Fat and oil**

Composition: fat are composed of carbon, hydrogen and oxygen

Sources : these are palm oil , palm kernel cake ,groundnut cake , coconut meal , linseed cake ,cotton seed cake , milk , lard , tallow,

Functions

Fats provides more energy than carbohydrates

Fats supply essential fatty acids and fat build-up

They also provide fat soluble vitamins

They improve the palatability of diet

Fats helps in the maintenance of body temperature

They prevent dustiness of feeds

**The Basics for Livestock Rations**

Every ration will be different depending on species, age, size and weight, gender, stage of reproduction, demands for production or work, and environment. The proper formulation of rations for livestock is dictated by appropriate nutrient requirements for each type of animal under a variety of conditions. The National Academy Press publishes a series of tables about nutrient requirements for livestock. The National Research Council (NRC) compiles the data for these publications which can be purchased or read online from the web site listed below. In addition to knowing the nutrient requirements, it is also necessary to know the nutrient composition of each feedstuff per ration. While the book value forage analysis is good information to compose a proper ration, when possible it is best to sample the individual feedstuff used and have it analyzed. The greatest variation between the book value and the actual value is in forages.

Note: Ruminants are animals whose digestive system contains fermenting microbes that help to digest forage.

Note: Components of a Ration:

Water

Protein

Energy

Fiber

Minerals

Vitamins

TYPES OF RATIO /DIET AND THEIR USES

Diet: a diet is defined as the amount of feed regularly given to or consumed by the animal. It is formulated to meet specific metabolic or physiological function such as: growth, lactation, maintenance of pregnancy, reproduction, egg laying etc.

Ration: ration is the total supply of feed given to an animal in a 24 hour period. In other words, ration is the amount of food taken by an animal per day

Balance Ration: a balance ration is the feed containing all essential nutrients in the correct quality and in adequate proportion for feeding animals.

Factors normally considered when deciding the type of ration to feed an animal

1. The purpose for which the animal is being kept
2. The class of animal
3. Age of the animal
4. Animal’s condition of health
5. Management system
6. Physiological state of the animals

Types of Ration

There are two types of Ration

Maintenance Ration : this is the type of ration given to the animals just to maintain normal functioning of the body

Production Ration: this is the type of ration given to the animals to enable them produce.

Categories of animals that require production ration are:

* + 1. Lactating Animals : for milk production
		2. Weaning Animals : for increase growth
		3. Pregnant Animals : for maintenance of the foetus
		4. Fattening animals : for extra addition of more flesh or meat
		5. Broilers : for rapid growth
		6. Layers : for more egg production
		7. Steaming up or flushing : for animals before mating to produce more ova/ovum

Malnutrition in animals

Malnutrition is a condition in which an animal shows evidence of nutritional deficiency .it occurs when a ration does not supply all the essential nutrients in the right proportion and quantities. In other words ,it result when an animal takes in insufficient food or eats diets which is deficient in one or more nutrient like proteins, carbohydrates ,minerals ,and vitamins .this eventually results n nutritional diseases.