AGRICULTURE

FOR

STANDARD 7

BY ZIKOMO MASESE BANDA **0999246769**

STANDARD 7 AGRICULTURE

Written by Zikomo Masese Banda

TABLE OF CONTENTS

UNIT **PAGE**

UNIT 1…FACTORS OF PRODUCTION…… 3
UNIT 2…MARKETING FUNCTIONS…… 4
UNIT 3…WATER CYCLE…… 8
UNIT 4…WATER POLUTION…… 10
UNIT 5…WATER CONSERVATION…… 12
UNIT 6…SOIL FERTILITY…… 12
UNIT 7…SOIL STRUCTURE…… 14
UNIT 8…SOIL PROFILE…… 14
UNIT 9…SOIL EROSION AND SOIL CONSERVATION…… 16
UNIT 10…FARM MACHINERY AND THEIR USES…… 18
UNIT 11…SAFETY MEASURES WHEN USING FARM MACHINERY…… 21
UNIT 12…MAINTENANCE OF FARM MACHINERY…… 21
UNIT 13…TYPES AND IMPORTANCE OF FLOWERS…… 22
UNIT 14…FLOWER NURSERY ESTABLISHMENT AND MANAGEMENT…… 22
UNIT 15…SITE SELECTION AND LAND PREPARATION FOR FLOWER PRODUCTION…… 24
UNIT 16…TRANSPLANTING FLOWERS…… 25
UNIT 17…MANURE AND FERTILIZER APPLICATION IN FLOWERS…… 26
UNIT 18…WEED CONTROL IN FLOWERS…… 26
UNIT 19…TENDING FLOWERS…… 27
UNIT 20…PEST AND DISEASE CONTROL IN FLOWERS…… 29
UNIT 21…HARVESTING FLOWERS…… 30
UNIT 22…TYPES AND IMPORTANCE OF VEGETABLES…… 31
UNIT 23…NURSERY ESTABLISHMENT AND MANAGEMENT FOR LEAF VEGETABLES…… 32
UNIT 24…SITE SELECTION AND LAND PREPARATION FOR GROWING LEAF VEGETABLES…… 35
UNIT 25…TRANSPLANTING LEAF VEGETABLES…… 36
UNIT 26…FIELD MANAGEMENT PRACTICES FOR LEAF VEGETABLES…… 37
UNIT 27…IMPORTANCE OF RABBITS…… 40
UNIT 28…HOUSING AND FEEDING RABBITS…… 42
UNIT 29…DISEASE AND PARASITE CONTROL IN RABBITS…… 45
UNIT 30…IMPORTANCE AND SYSTEMS OF AGROFORESTRY…… 47
REFERENCE…… 50

FIRST EDITION 2018

WHATSAPP # 0991295167

Factors of production are the resources that are used to produce crops and livestock.

MAJOR FACTORS OF PRODUCTION

- land
- labour
- capital
- management

a) Land

This is where most of the farming activities take place.

THE CHARACTERISTICS OF LAND THAT AFFECT AGRICULTURAL PRODUCTION

- Size
- Fertility
- Slope

Size:

- If a farmer cultivates a big area, the total yield will be more than from a tiny land.

Fertility:

- A fertile land has enough nutrients, air and moisture for crop growth. Such land will yield more crops.

Slope:

- Land with a gentle slope maintains its top soil because it is not easily eroded. Such land supports plant growth.

b) Labour

- This is the effort of people in doing farm operations or work done by people.

c) Capital

- This refers to materials available on the farm for production.
- Capital items are cash, farm inputs, equipment, tools, buildings and livestock.

d) Management

- This refers to the farmer's knowledge and skills in performing farm operations.

Farm management involves:

* planning the farm work
* controlling the use of land, labour and capital
* supervising the work
* making farming decisions
* budgeting for farm activities
* organizing the land, labour and capital

UNIT 2 MARKETING FUNCTIONS

Marketing functions are activities conducted by producers or intermediate buyers in order to make profit and satisfy the needs of customers.

MARKETING FUNCTIONS

Marketing does not only involve buying and selling.

Marketing involves many activities.

These include:

- ♦ buying
- ♦ selling
- ♦ processing
- ♦ grading
- ♦ packaging
- ♦ advertising
- ♦ storage
- ♦ transporting
- ♦ market research

Buying

- This means paying for goods to own them.

ACTIVITIES INVOLVED IN BUYING

- ♥ determining needed goods
- ♥ identifying where to obtain the goods
- ♥ choosing desired goods
- ♥ bargaining
- ♥ paying for goods
- ♥ collecting the goods for use

IMPORTANCE OF BUYING

- ♥ the buyer becomes the owner of the goods in order to use them when needed.

Selling

ACTIVITIES INVOLVED IN SELLING

- * deciding where to sell
- * displaying products to attract customers
- * pricing products
- * issuing or offering the produce to the customer
- * collecting payment

IMPORTANCE OF SELLING

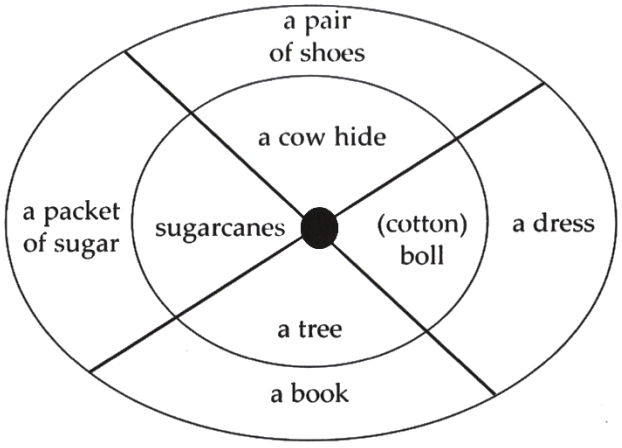
- It enables the farmer to obtain a reasonable income which can be used to buy inputs for the farm business or to satisfy personal needs.

Processing

- Processing means changing the raw materials into finished products.

Processing increases the value and usefulness of agricultural products.

Agricultural raw materials and their processed products



ACTIVITIES INVOLVED IN PROCESSING

- ♠ grinding
- ♠ pounding (milling)
- ♠ cleaning
- ♠ shelling
- ♠ boiling
- ♠ sieving

- ♠ winnowing
- ♠ drying
- ♠ slicing
- ♠ salting

Transporting

- This involves carrying the agricultural produce to the market.

IMPORTANCE OF TRANSPORTING GOODS TO THE MARKET

- Goods are made readily available to customers.
- The farmer can also easily sell the produce at a better price since many customers at the market will compete to buy the produce.

ACTIVITIES INVOLVED IN TRANSPORTING

- assembling
- identifying mode of transport

Market research

- This involves finding out prices of various products in different markets.

IMPORTANCE OF MARKET RESEARCH

- Market research helps the farmer in deciding what to produce and where to sell it.

ACTIVITIES INVOLVED IN MARKET RESEARCH

- interviewing people
- recording responses
- interpreting information

Grading

- This involves sorting out produce to ensure uniformity in quality.

Different types of agricultural produce are graded differently depending on certain factors.

FACTORS FOR GRADING

- size
- shape

- colour
- tenderness
- taste
- age
- weight

ACTIVITIES INVOLVED IN GRADING
- sorting
- weighing

IMPORTANCE OF GRADING
- it helps in pricing the produce
- it enables the farmer to get more money for produce of high grade
- it encourages the farmer to aim at producing quality products.

Packaging
- This involves placing the produce into appropriate containers.

ACTIVITIES INVOLVED IN PACKAGING
- wrapping
- sealing
- labelling
- weighing

IMPORTANCE OF PACKAGING
- it makes pricing the produce easy
- it makes it easy for customers to choose produce in quantities suitable for their needs
- it makes it easy for customers to carry produce in quantities suitable for their needs

Storage
- This involves keeping the produce in a safe place

ACTIVITIES INVOLVED IN STORAGE
- application of chemicals
- cleaning storage facility
- stocking

IMPORTANCE OF STORAGE

- it preserves the quality of the produce
- it makes the product available when customers need it most
- it helps the farmer to sell at a better price to increase profit

Advertising

- This involves telling people about a product, letting the customers know why it may be best for them to buy it.

ACTIVITIES INVOLVED IN ADVERTISING

- displaying
- attractive wrapping
- labelling

IMPORTANCE OF ADVERTISING

- it helps in increasing sales

UNIT 3 WATER CYCLE

MEANING OF THE TERM 'WATER CYCLE'

Water cycle is the continuous movement of water on above and below the surface of the earth in different forms.

or

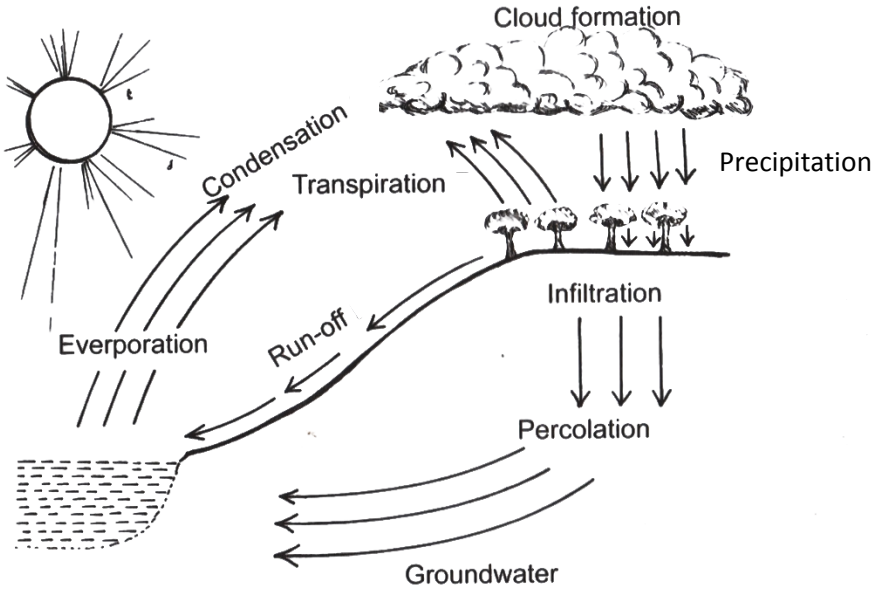
Water cycle is the continuous movement of water on, above and below the surface of the earth in different forms.

These forms can be liquid, gas or solid.

Since it is a cycle, there is no beginning or ending.

PROCESSES AND STAGES OF WATER CYCLE

Some of the processes and stages are evaporation, transpiration, condensation, precipitation, surface run-off and infiltration.



i) Evaporation

Evaporation is the loss of water from soil and water bodies into the atmosphere in form of vapour.

ii) Transpiration

Transpiration is the loss of water from plant leaves into the atmosphere through plant openings in form of vapour.

The combination of evaporation and transpiration is called Evapotranspiration.

iii) Evapotranspiration

Evapotranspiration is the loss of water from the soil, oceans, lakes, rivers and plants into the atmosphere as vapour.

iv) Condensation

Condensation is the process by which water vapour in the atmosphere is changed into droplets.

When there is an accumulation of water droplets clouds are formed.

v) Precipitation

Precipitation is the falling of water from the atmosphere to the earth in form of rain and hail.

Precipitation is also called rainfall.

vi) Surface run-off

Surface run-off is the water that flows on the soil surface following the slope of the land.

vii) Infiltration

Infiltration is the entry of water into the soil.

viii) Percolation

Percolation is the moving deeper of water in the soil increasing the amount of ground water.

ix) Ground water

Ground water refers to large amounts of water stored below the earth's land surface.

x) Open water bodies

Open water bodies refers to water existing on the land surface such as rivers, lakes, ponds, oceans and dams.

UNIT 4 WATER POLLUTION

Pollution is the contamination of the environment with harmful and poisonous substances arising from human activities.

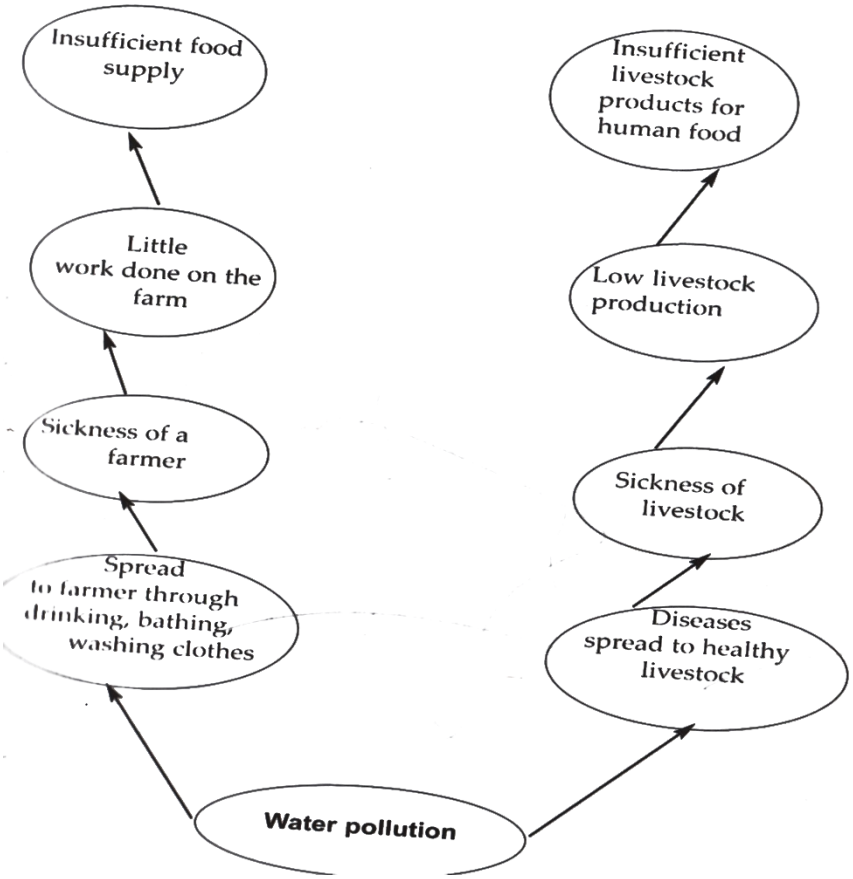
CAUSES OF WATER POLLUTION

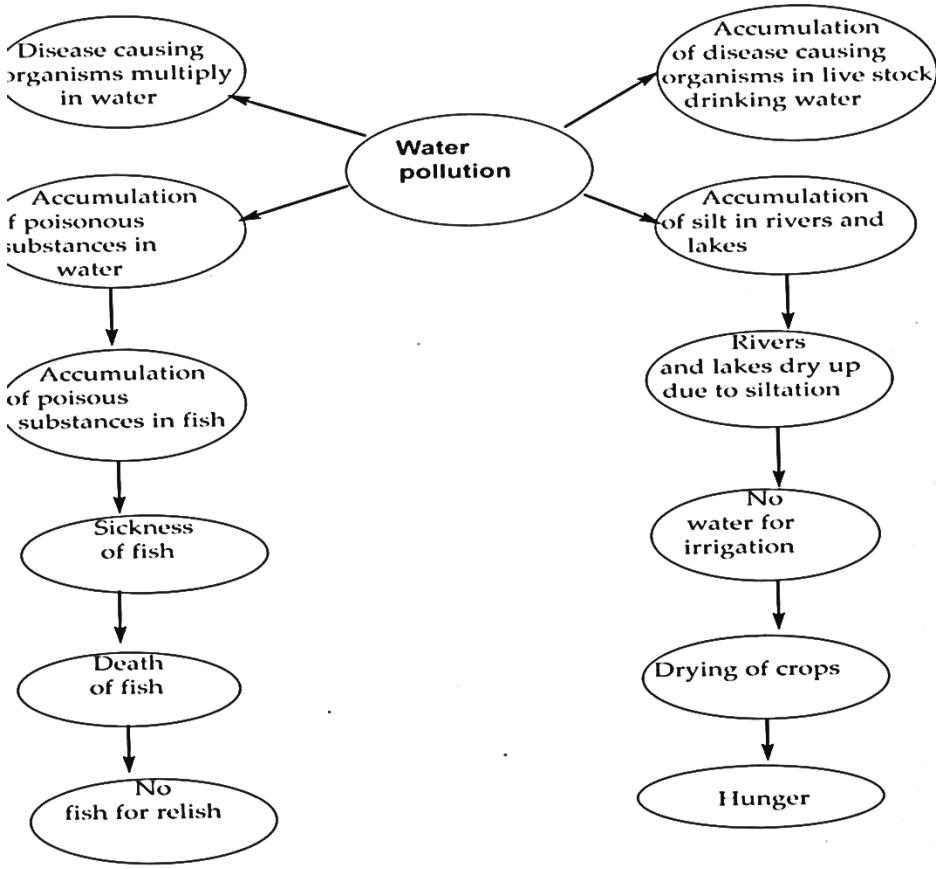
- disposal of human wastes
- constructing pit latrines close to water bodies
- disposal of domestic, industrial and hospital wastes into water bodies
- siltation of water bodies
- use of poisonous herbs and chemicals when catching fish
- application of fertilizers, herbicides and pesticides to crops in the field which are then eroded together with soil into nearest water bodies

EFFECTS OF WATER POLLUTION ON AGRICULTURAL PRODUCTION

- reduced work done by the farmer
- death of plants
- death of livestock
- blocking irrigation pipes
- shortage of water for irrigation

FUTURE'S WHEELS SHOWING CONSEQUENCIES OF WATER POLUTION





WAYS OF CONTROLLING WATERPOLLUTION

- building proper and well located pit latrines
- using recommended chemicals in proper amounts for agricultural activities
- avoid urinating, defecating, bathing washing clothes and dishes in water which is used for drinking, animal production and irrigation
- avoid damping kitchen, industrial and hospital wastes in water bodies
- protecting wells and boreholes by fencing them and cementing the floor
- provide ground cover to prevent siltation

WAYS OF KEEPING WATER SAFE

- boiling
- adding chemicals such as chlorine and water guard
- filtering
- protecting boreholes and wells
- siting pit latrines away from water sources

UNIT 5 WATER CONSERVATION

Water conservation refers to the ways of reducing water loss from soil allowing more water to infiltrate in the soil and collecting surface run-off for future use.

WAYS OF CONSERVING WATER

- use of vegetative cover
- application of organic matter
- mulching
- use of contour ridges, bands and box ridges
- constructing dams
- removing silt and other material that accumulate in water bodies
- making ridges across the slope
- maintaining vegetative cover along river bank
- water harvesting

UNIT 6 SOIL TEXTURE

Soil texture is the coarseness or fineness of the soil.

or

Soil texture is the percentage of sand, silt and clay in a soil.

CLASSIFICATION OF SOILS BASED ON TEXTURE

There are three main classes of soil based on texture.

These are sand, clay and loam soils.

CHARACTERISTICS OF CLASSES OF SOIL

Class of soil	Characteristics
Sand	• large particles • feels coarse • large air spaces • holds little water • little amount of nutrients • easiest to till and ridge
Loam	• medium particle • feels fine and soft • medium air spaces • holds moderate amount of water • holds medium amount of nutrients • easier to till and ridge
Clay	• small particle size • feels sticky when wet • small air spaces • holds a lot of water • contains high amount of nutrients • difficult to till

SOME CROPS SUITABLE FOR DIFFERENT SOIL CLASSES

Class of soil	suitable crops
Sand	cassava, groundnuts, Irish potatoes, sweet potatoes
loam	maize, groundnuts, beans, peas, pigeon peas, tobacco, okra, Irish potatoes, soya beans
clay	rice, sugarcane, cotton

UNIT 7 SOIL STRUCTURE

Soil structure is how soil particles are held together.

or

Soil structure is the arrangement of soil particles to form different shapes.

CHARACTERISTICS OF DIFFERENT SOIL STRUCTURES

There are different types of soil structures. Some of these soil structures are loose, crumb and compact.

Loose structure

- the individual soil particles are lightly held together
- it has large pore spaces between the particles
- it loss water quickly
- it is very easy to break

Crumb structure

- the individual soil particles are moderately held together
- it has medium pore spaces between the particles
- it breaks quickly
- it holds moderate amount of water

Compact structure

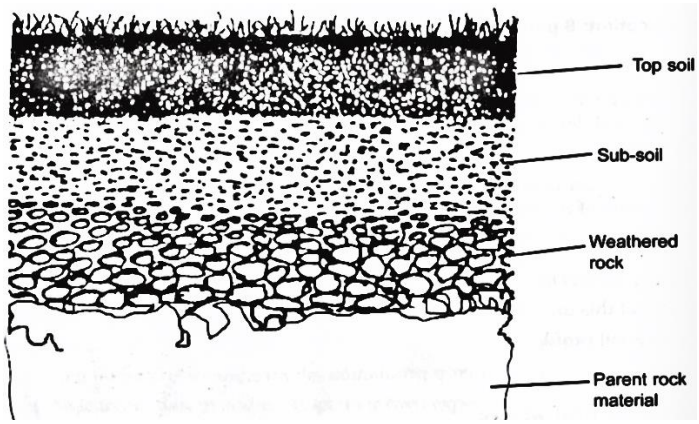
- the individual soil particles are strongly held together
- it has very mall pore spaces between the particles
- it loss water quickly
- it is difficult to break
- it holds high amount of water

UNIT 8 SOIL PROFILE

Soil profile refers to the vertical section through the soil showing horizontal layer.

Most soils have four main layers.

These are top soil, sub soil, weathered rock and parent rock.



LAYERS OF SOIL AND THEIR CHARACTERISTICS

Top soil
- This is upper layer of soil profile.
- Most living organisms are found in this layer.
- This layer has a high organic matter content.
- This gives the layer its dark brown or black colour, better aeration and high nutrient content.

Sub-soil
- This layer lies below the top soil.
- There is less organic matter or humus.
- This layer has a lighter colour than top soil.
- The colour may be red or reddish brown.
- The layer contains some nutrients washed down from top soil.

The washing down of nutrients from top soil to the sub soil is called leaching.

Roots of most crops do not reach this layer.

Generally, the sub soil is less fertile than top soil.

However, some deep rooted crops such as trees may penetrate this layer.

Weathered rock
- This layer lies below the sub-soil. It contains gravel, broken rocks.
- The colour of this layer varies.
- It depends on the mineral composition of the rock and penetrate this layer.

Parent rock
- This is a rock which has not been broken down to form soil.
- It is also called a bed rock.

THE CHARACTERISTICS OF TOP SOIL THAT PROMOTE CROP PRODUCTION

Characteristics	**Importance for crop production**
high nutrient content	supplying adequate amount of plant food for growth
better aeration	supply air (oxygen) needed for seed germination and root respiration
better water retention	supply adequate water for seed germination and plant growth
black colour	it helps the soil to absorb heat which provide warmth necessary for seed germination and seedling development
high humus content	humus improves soil aeration, water retention and nutrient content of the soil
presence of soil organisms	these help to improve soil aeration like earth worms

UNIT 9 SOIL EROSION AND CONSERVATION

Soil erosion

Soil erosion is the removal of top soil by the action of water and wind.

CAUSES OF SOIL EROSION

- careless cutting down of tree
- cultivating on steep slopes
- cultivating along river banks
- making ridges along the slope

EFFECTS OF SOIL EROSION

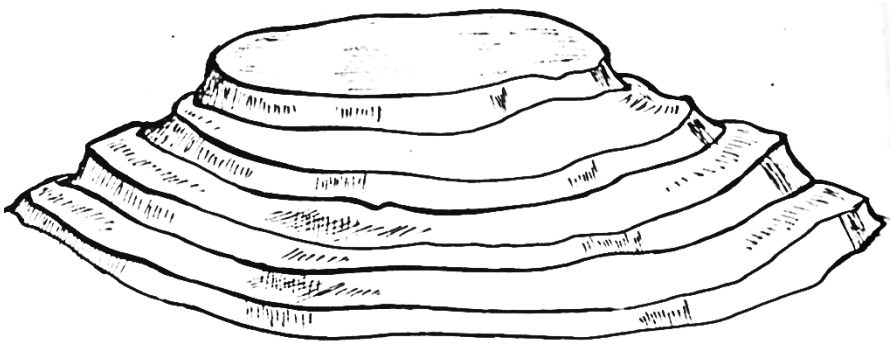
- loss of fertile soil resulting into low yields
- reduced amount of ground water as a result of fast moving water which reduces infiltration
- silting of rivers, streams, dams and lakes reducing the amount water bodies and destroying aquatic life
- formation of gullies leading to reduction of land for cultivation
- exposure of plant roots causing lodging of crops

SOIL CONSERVATION

- avoiding overstocking
- making terraces on steep land
- mulching
- correct spacing of crops

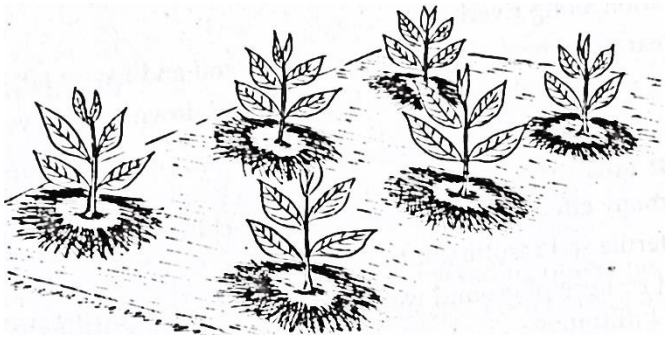
- strip cropping
- making ridges across the slope
- making box ridges
- making contour bands

TERRACES ON STEEP SLOPE



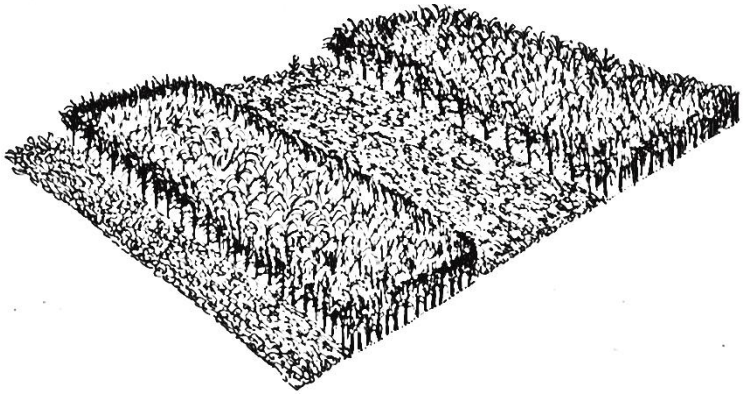
Making terraces on steep slopes. This conserves soil by reducing the speed of running water.

MULCHING



Mulching material reduces the speed of running water which can carry soil away.

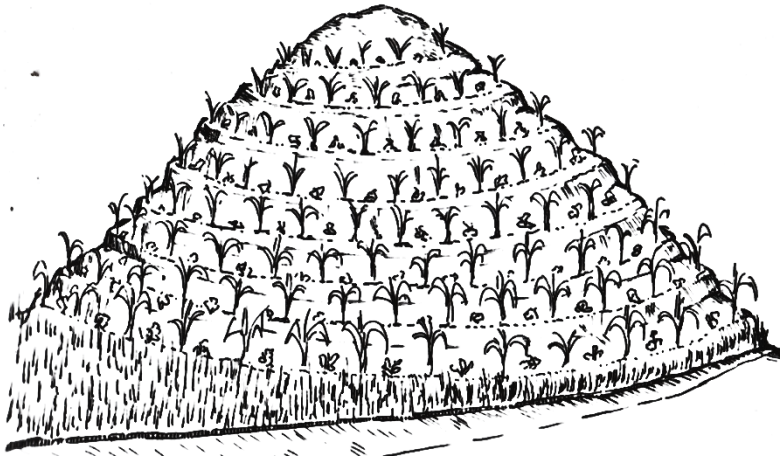
STRIP CROPPING



Strip cropping involves alternating strips of poor cover crops (maize) with good cover crops (groundnuts) across the slope.

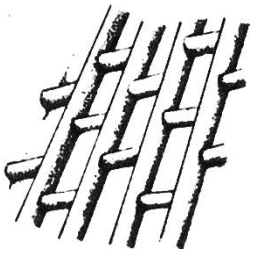
The soil that has been eroded by poor cover crops is trapped by good cover crops.

RIDGES ACROSS THE SLOPE



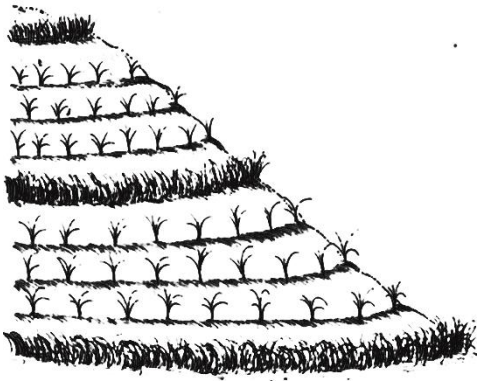
Making ridges across the slopes reduces speed of run-off

BOX RIDGES



Making box ridges reduces amount of run-off by holding water in the boxes.

CONTOUR BANDS



Making contour bands holds water and reduces amount of run-off thereby controlling erosion.

UNIT 10 FARM MACHINERY AND THEIR USES

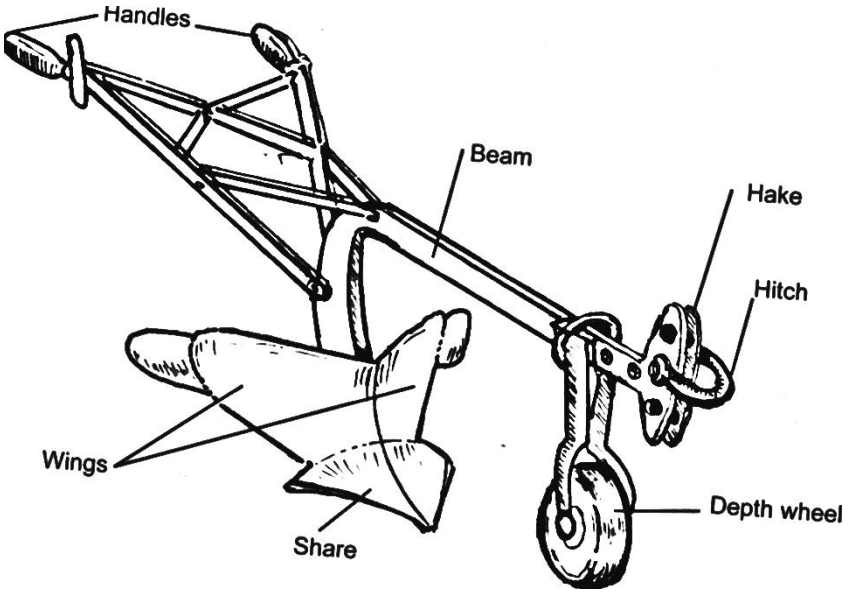
FARM MACHINERY AND THEIR PARTS

There are different machinery that farmers use. These include ploughs, ridgers and sprayers.

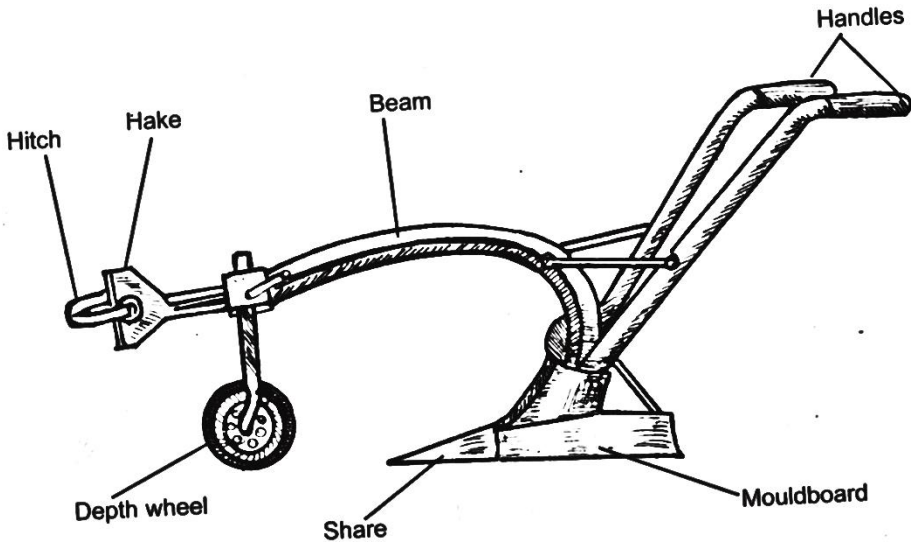
USES OF FARM MACHINERY

MACHINERY	USES
plough	tilling the soil
ridger	making ridges
sprayer	applying chemicals to crop and animals to control pests, parasites and diseases.

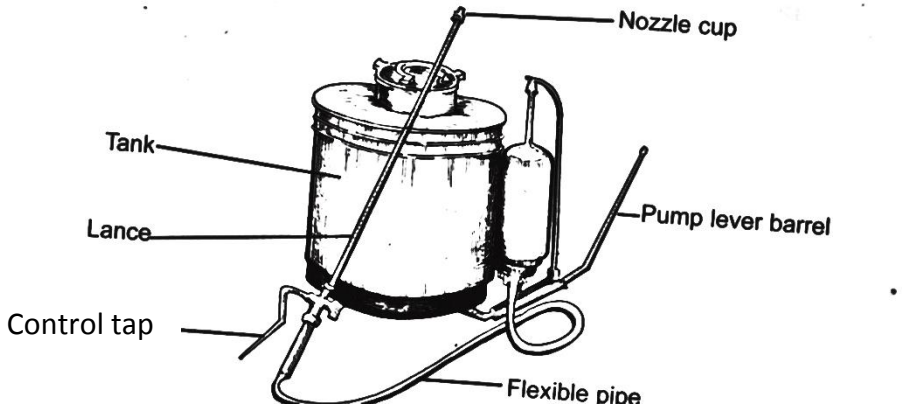
PARTS OF A RIDGER



PARTS OF A PLOUGH



PARTS OF A SPRAYER



USES OF PARTS OF PLOUGH AND A RIDGER

PARTS	USES
handles	enable the farmer to hold and guide plough and ridger
beam	holds all parts of a plough or a ridger
share	Cuts the soil into thin layer
hake	sets the depth of ploughing
depth wheel	helps to move the plough or ridger and maintains depth
hitch	attaches the plough or ridger to the chain or axle
mould board	throws the soil cut loose by share to one side and turns it over (for plough)
wings (for ridger)	pushes the soil to each side so that on the return run a complete ridge is made during ridging

USES OF PARTS OF A SPRAYER

PARTS	USES
plastic container	holds the spray materials
plain pump barrel	creates pressure which forces the spray to come out through the lance
lance	delivers the spray
nozzle	a hole through which the spray comes out
control tap	helps to control the amount of spray that comes out
sieve	filtering the spray to avoid blocking the nozzle
shoulder strap	for holding the sprayer
nozzle cups	holds nozzle disc in position

UNIT 11 SAFETY MEASURES WHEN USING FARM MACHINERY

SAFETY MEASURES WHEN USING PLOUGHS AND RIDGER

- Ensure that the machine is in good working order
- Soil must be fairly moist when either ploughing or ridging
- There must be no stumps or large stones in the field during ploughing or ridging
- The plough or ridger must be handled firmly and correctly
- The nuts and bolts must be tight
- Oxen used to pull the plough or ridger must be well trained
- The yoke must be tied to the plough property

SAFETY MEASURES WHEN USING SPRAYER

- keep the control tap tight.
- avoid sucking or blowing through the nozzles to prevent chemical poisoning
- always wear protective clothes when spraying
- face away from the wind side when spraying so that chemicals are not blown into the face.
- do not eat, drink or smoke while spraying.
- the sprayer must be thoroughly cleaned after use
- wash your body with soup after spraying
- chemicals from the sprayer must be properly disposed of to avoid pollution of air, soil and water.

UNIT 12 MAINTENANCE OF FARM MACHINERY

MAINTENANCE OF A RIDGER, A PLOUGH OR SPRAYER

Remember the following points or rules when caring for a ridger, plough and sprayer:

☺ know the parts and how they work or function
☺ set the machine correctly for it to perform properly
☺ clean the machines and dry them immediately after use to prevent rusting
☺ grease all movable parts to prevent friction between them
☺ tighten nuts and bolts to prevent spoiling the threads on the nuts and bolts
☺ replace warn out parts such as the share, mould boards, nozzle and handle.
☺ transport a plough or a ridger properly in an ox-cart or by tying the handles to the york and pulling it on the depth wheel in reverse position.
☺ paint the machinery at the end of each growing season
☺ keep plough, ridger or sprayer in dry store room or shed for safety
☺ use the machine for purposes it was made
☺ read the accompanying manual if available
☺ lift up or lay down the machinery after use and avoid throwing them away anyhow

UNIT 13 TYPES AND IMPORTANCE OF FLOWERS

TYPES OF FLOWERS

There are different types of flowers based on how they grow.

a) creepers or climbers

These flowers have stems which need support because the stems are weak and grow along the ground. The flowers look beautiful when supported by a wall, strings, trees and fences. Examples of the creepers are money plant, and bougainvillea.

b) ground covers

These flowers have stems which do not grow tall. The stems do not need support. The flowers produce many side branches and cover the ground. Examples of such flowers are geranium, periwinkle, marigolds, zinnia, dahlia and ferns.

c) trees

These flowers have stems that grow very big and tall. The stems are also tough. The trees are grown because they produce beautiful shape, fruits, petals and leaves. Examples of such flowers are jacaranda, acacia and conifers.

d) shrubs

These have stems which are thick and tough after first year of growth. They produce many branches which can be trimmed to a variety of shapes. Examples of such flowers are hibiscus, roses, fushsia, and poinselta.

IMPORTANCE OF FLOWERS

- ☺ They decorate the surrounding
- ☺ Source of income
- ☺ Source of medicine
- ☺ Source of raw material
- ☺ Provide protection
- ☺ Some flowers are grown to scare away harmful pests and other animals such as marigold and night queen.

UNIT 14 FLOWER NURSERY ESTABLISHMENT AND MANAGEMENT

ESTABLISHMENT OF FLOWER NURSERIES

Establishment a flower nursery involves site selection, land preparation, planting or sowing, weeding, pest and disease control and hardening off.

Site selection

FACTORS TO CONSIDER WHEN CHOOSING A SITE FOR A FLOWER NURSERY

- Should be close to water supply for easy watering
- Should be close to home or office or fenced area for protection
- Loam soil for good drainage

Land preparation

Land preparation involves the following:

- clearing the land
- constructing a fence
- preparation of planting materials

Preparing nursery bed

Preparation nursery bed for cuttings

a. till the cleared site to break to break the hard subsoil so that water drains freely
b. level the tilled land to make the plate flat
c. mark the bed 1 metre wide 5 centimetre high using bricks, soil or wood so as to create a basin for easy watering
d. fill the marked are with 15 centimetre depth of river sand for free drainage for easy rooting
e. cover the top of the prepared bed with a clear plastic paper. This will protect the bed from direct sun heat, too much water from rains and will produce heat that will make buds of cuttings to open quickly

Preparation of nursery bed for seeds

a. small seeds can be established in trays with holes at the bottom, large seeds can be sown in the pots filled with soil
b. prepare soil to fill trays or pots by mixing top soil rich in manure, sand and madeya or sawdust, rice husks in the ratio 2:1:1
c. arrange the trays or planting pots on levelled land to form a 1 metre wide bed
d. fill the container with the soil

Planting

Planting cutting

a. select planting materials from fresh clean stems to prevent carryover of pests and diseases
b. make a 15cm long cutting by making the base flat and making the cut close to a node in order to easily identify the side to place in soil
c. cut the top of the cutting in a slanting manner to allow water to drain away
d. remove leaves from the cutting except 2 leaves at the top of the cutting for fast growth

e. water the planting bed adequately
f. plant cuttings 7.5 cm deep and the correct way up and in a slanting manner
g. avoid excessive watering to prevent damping off and leaching

Planting large seeds

a. make a hole in the potted soil
b. place the large seed in the holes
c. water the pots adequately

Planting small seeds

a. make a drill in planting trays
b. sow small seeds in the drill thinly
c. cover lightly with soil
d. cover the trays with grass
e. water the planted trays

MANAGING A FLOWER NURSERY

The activities involves in managing flower nursery include watering, weeding, controlling pests and diseases and hardening off.

- watering should be done twice a day early in the morning and late in the evening
- weed by uprooting
- pests and diseases should be controlled using appropriate measures
- hardening off – before transplanting seedlings reduce frequency of watering so that seedlings withstand field conditions

UNIT 15 SITE SELECTION AND LAND PREPARATION FOR FLOWER PRODUCTION

FACTORS TO CONSIDER WHEN SELECTING SITE FOR GROWING FROWERS

- type of flower
- height of flower
- colour of flower
- colour of surroundings

LAND CHARACTERISTICS

- slope of the land – make use of land characteristics. For instance, on steep land plant ground covers or make terraces for planting flowers, on rocks make a rock garden

- site of the bed – the site of the flower bed will affect the size and type of flower.
  If flowers are to be planted between gutter and wall, it may be a narrow bed and choose rooted flowers to avoid damaging the structure.

LAND PREPARATION

When preparing land follow the following steps:

- choose the site for flower garden
- mark the bed according to the desired size and shape
- lay out the bed according to design
- dig the marked area to a depth equal to root depth of flowers

DEPTH OF HOLE FOR DIFFERENT TYPES OF FLOWERS

TYPES OF FROWER	DEPTH OF HOLE
shrubs	30 cm deep
ground cover	7.5 - 15cm deep
trees	90cm deep

- cover the planting hole with the top soil first, then subsoil mixed with well decomposed manure

UNIT 16 TRANSPLANTING FLOWERS.

STEPS FOR TRANSPLANTING SEEDLINGS INTO FLOWER POTS

- Watering the plants 3 – 4 hours before transplanting so that roots, stems and leaves are full of water as well as the soil around the roots.
- preparing soil for pot filling
- filling soil in flower pots
- making a planting hole
- lifting the seedlings with a hand trowel without damaging the roots
- place the lifted seedlings into the hole made in the planting pot without bending the roots.
- cover the transplanted seedlings up to the collar neck
- press the soil around the seedlings to make seedlings stand firm
- place the potted plants under shed when it is hot season
- water the transplanted plants.

STEPS FOLLOWED WHEN TRANSPLANTING SEEDLINGS TO FIELD BEDS

- water the field bed hole 3 – 4 hours before transplanting
- dig a planting hole
- place the pot in the hole

- remove the planting pot by tearing on the side, this is to allow free growth of stem and roots later, circulation of air and water
- cover the plant with soil to the collar neck
- press the soil around the plant to make seedling stand firm
- water the transplanted seedlings
- mulch the seedling to protect from excess sunlight
- water the plant every 4 days until it get established

Transplanting should be done on a cool day or early in the morning or late in the afternoon to reduce loss of water from the seedlings.

UNIT 17 MANURE AND FERTILISER APPLICATION IN FLOWERS

FERTILISER AND MANURE APPLICATION TO FLOWERS

Fertilizers and manure are applied to flowers to encourage growth.

Different types of manure are applied such as compost manure and animal manure.

Well decomposed manure should be applied.

The manure can be mixed with soil before transplanting.

When the flowers are well established, the manure can be spread (broadcasted) in the flower beds.

Where the flowers are planted in the rows sparsely planted, the manure can be applied in grooves.

The common fertilizers applied in the flowers are 23:21:0+4S and CAN.

The fertilizers are applied using dollop method, banding method and broadcasting method depending on how flowers are planted.

Apply 23:21:0+4S soon after transplanting.

When flowers are well established apply CAN.

UNIT 18 WEED CONTROL IN FLOWERS

COMMON WEEDS IN FLOWER GARDENS

Some of the weeds in flower gardens are star grass, datura, oxalis, chisoso, Tridax, galisoga.

A flower garden has to be free from weeds for it to be beautiful.

METHODS OF WEED CONTROL IN FLOWER GARDENS

In a flower garden, weeds can be controlled using the following methods:

- light hoeing
- hand weeding
- slashing
- chemical weeding

GUIDELINES WHEN WEEDING FLOWER BEDS

- ensure that weeds are well controlled
- avoid destroying the flower plants
- ensure the garden is left neat

WHEN TO USE DIFFERENT METHODS OF WEEDING

METHODS	WHEN
hand weeding	when weeds are very close to plant when flower plants are closely spaced
light hoeing	when space between flowers allows use of a hoe without damaging the flower
slashing	when flowers are widely spaced
chemical weeding	when controlling weed before they emerge killing the weeds using selective herbicides

UNIT 19 TENDING FLOWERS

MEANING OF THINNING

Thinning is the removal of excess plants on a flower bed or field.

REASONS FOR THINNING

- to reduce competition between plants and nutrients, air, water, space and sunshine.
- to ensure healthy growth of the flower
- to maintain beauty of the flowers

PROCEDURES FOR THINNING

- water the flower beds to make the soil moist
- uproot the weak, diseased or any excess plants leaving the correct number per station

MEANING OF PRUNING

Pruning is the removal of unwanted parts of a flower plant such as dead, old, excess and diseased branches, leaves and flowers.

REASONS FOR PRUNING

- to improve quality of the flowers
- to maintain plant health
- to restrict growth
- to train the plants

PROCEDUCE FOR PRUNING FLOWER

- remove dead, old and diseased leaves
- remove dead heads and fading flowers
- remove branches which are dead, trailing, diseased, excess and off shape by cutting them from the bottom upward to avoid tearing the flower plant. The cutting should be done at an angle to facilitate water drainage

MEANING OF TRIMMING

Trimming is the cutting back of flower branches.

REASONS FOR TRIMMING

- to make a desirable shape
- to make flower plants become less bushy
- to restrict growth

PROCEDURE FOR TRIMMING

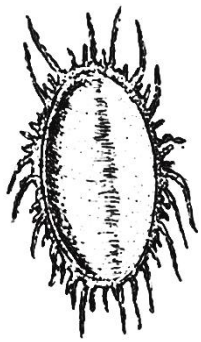
- measure the desirable height and mark
- cut back the branches to the intended height
- cut the branches to the desirable shape

UNIT 20 PEST AND DISEASE CONTROL IN FLOWERS

PESTS AND DISEASES OF FLOWERS

1. PESTS OF FLOWER

Mealy bugs



These are found on undersides and axils of leaves and young shoots. They produce a sticky substance called honeydew on which grows a black mould. They live by sucking plant juices. They can be controlled by using clean planting materials.

Aphids



These cause twisting of leaves and flowers. They also produce sticky substances called honeydew that attracts ants. They can be controlled by using dimethoate or marathion, hot pepper and garlic.

Scaley insects

They are identified as bumps on stems and undersides of leaves where they produce substance called honeydew resulting in stunted growth. They live by sucking plant juices. They can be controlled by Marathion or Noadazinon.

White flies

They are found on undersides of the leaves and produce sticky substance called honeydew where a black mould can develop. They live by sucking plant juices. They can be controlled by clean planting materials.

Spider mites

These are found on the undersides of the leaves. They suck plant juices. They can be controlled by interplanting with strong smelling plants like marigold and using Dimethoate, Actellic and Rogor.

Slugs or Snails
They are found around dark, moist, decaying matter. They eat leaves. They can be controlled by hand picking or use of sodium bicarbonate and common salt.

2. DISEASES OF FLOWERS

Grey mould
- This is caused by fungus.
- It affects leaves, flowers and roots.
- It can be controlled by cutting away the dead rotting part and burn it
- It can also be controlled by fungicides

Beech bark disease
- It is caused by fungus spread by scale insect
- It affects the bark and penetrates inwards until the tree dies
- It can be controlled by felling the infected tree to minimise the spread of disease

Giant polypore fungus
- This disease is caused by fungus
- It usually affects mature or over-mature trees
- It attacks the roots
- It can be controlled by cutting down the tree and burn it

UNIT 21 HARVESTING FLOWERS

There are three products that can be harvested from flowers and shrubs.

These are:
- true seeds
- cuttings
- real flowers (cut flower)

PROCEDURE

The best stage to harvest or cut flowers for sale depends on the types of flowers.

Generally, flowers must be harvested just before or as soon as they reach maturity.

The bud should not be completely open.

Cut the flowers during the cool morning hours. At that time dew should dried.

Use a pair of scissors, garden share, secuture and knives to cut the flower. These materials should be kept sharp to ensure that stems are cut evenly and not crushed. Crushed stems restrict the ability of the flowers to take up water thereby reducing their life.

PRESERVING FLOWERS

- Air drying

Flowers are cut at uniform length and hang upside down in branches in a dark, dry room to prevent fading of colour through sunlight

- Pressing

Flowers are pressed between newspapers. Alternating layers of flowers and paper are pressed between two boards. A heavy object is then placed on the top board. The pressed flowers are usually stored in the stuck until needed.

- Dipping in a mixture of water and glycerine

Flowers are dipped in a solution of water and glycerine for two to three weeks.

Freshly harvested flowers should be placed in lukewarm water that has floral preservatives.

The preservatives increase flower's life.

- Drying in silica gel

Silica gel absorbs moisture from flowers. Flowers are placed in a closed container with silica gel. It is recommended that flowers dried in this way should be stored and displayed in the closed containers to keep out moisture.

UNIT 22 TYPES AND IMPORTANCE OF VEGETABLES

TYPES OF VEGETABLES

There are two main types of vegetables. These are indigenous and exotic

Indigenous vegetables

These are vegetables found naturally in a country for example Malawi.

These include chisoso, mwanaaligone, luni, bonongwe, limanda, thugwi, chewe, bowa and njerenjedza.

Exotic vegetables

These are vegetables introduced in a country from elsewhere.

These include cabbage, rape, carrot, tomato, bowa and eggplant.

CLASSES OF VEGETABLES

Vegetables can be classified according to edible parts.

The following are the classes of vegetables:

Leaf vegetables
Cabbage, mustard, bonongwe, rape and spinach.

Root, tuber and bulb vegetables
Carrot, European potatoes, onion, sweet potatoes and beetroot.

Fruit vegetables
Tomatoes, eggplants, pepper, pumpkins, cucumbers.

Legume vegetables
Peas and fresh beans, fresh cowpeas

For some vegetables the whole plant is eaten such as mushroom.

IMPOTANCE OF VEGETABLES

- sources of food
- sources of income
- sources of employment
- sources of raw materials

UNIT 23 NURSERY ESTABLISHMENT AND MANAGEMENT FOR VEGETABLES

NURSERY ESTABLISHMENT

Some of the activities involved in vegetable nursery establishment are site selection, seed selection, seed bed preparation and sowing.

SITE SELECTON
A vegetable nursery should be near a water source near the home or school for easy management and on sandy loam soil for easy drainage

SEED SELECTION

It is important to select good seed for sowing to ensure high germination percentages and health strong seedlings.

Seed can be selected from previous crop or bought.

Check the expiry date to avoid buying seeds which have overstayed as this will lead to low germination percentage.

NURSERY BED PREPARATION

After selecting site for a vegetable, it must be fenced.

The land must be tilled to a depth of more than 15cm to loosen the soil and improve the drainage.

The bed should be 1 metre wide and 15 cm high.

A bed can be of any length.

The bed must be flat to avoid run-off.

Make a mixture of two parts of loam soil, one part manure and one part sand.

Spread the mixture over the bed to a depth of 15 cm.

SOWING SEEDS

Large vegetable seeds as those of pumpkins, peas and beans can be sown directly on the field beds.

Small seeds should be sown in furrows (drills) 1.5 cm deep and 10-20cm apart along the width of the seedbed in straight lines for easy management and extraction.

Spread the seeds thinly in the furrows and cover lightly with soil.

Erect a raised mulch which will also serve as a temporary shade.

NURSERY MANAGEMENT

Vegetable nursery management involves a number of activities.

These activities include watering, weeding, thinning, pest and disease control and hardening off.

Watering

Water seedbeds in the morning and late in the afternoon everyday until the seedlings are four weeks old.

Avoid watering at midday when evaporation is highest.

Avoid under-watering because it will result into wilting.

Weeding

Weeding is necessary to reduce competition between weeds and seedlings for nutrients, water, light and space.

It also reduces the attack by pests and diseases.

Hand weeding is recommended to avoid damaging roots.

It is necessary to make the soil loose using a small, sharp stick or a hand folk.

Thinning

Thinning can be done when there are too many seedlings in the farrows (drills).

Seedlings may be thinned to 20cm apart when they are about two weeks old.

PEST AND DISEASE CONTROL

Seedlings have to be protected from pests and diseases. Some pests of vegetable seedlings are caterpillars, grasshopper, nematodes and aphids.

PEST CONTROL IN VEGETABLE NURSERY

PEST	CONTROL
Aphids	spray marathion spray with tephrosia
grasshoppers	spray Carbaryl
cutworms	drenching the soil with actellic 1ml in 1 litre of water
caterpillars	spray Carbaryl at a rate of 85g in 14 litres of water

All these pests can be controlled by spraying with tephrosia or using smelly mulching materials like lemon grass, mpungabwi or plant strong smelling crops for example garlic.

DISEASES

Dumping off is one of the common diseases in the vegetable nursery.

It is caused by fungus and promoted by overwatering.

It can be prevented by:

- ♠ sowing at recommended spacing
- ♠ sterilising the soil before sowing
- ♠ dusting the seed with a fungicide such as captain and thiram
- ♠ frequent weeding
- ♠ avoid overwatering

HARDENING OFF

This is the gradual reduction of frequency of watering to seedlings.

This is done to prepare seedlings for the hot and dry condition in the garden.

The temporary mulch should be removed in the second or third week after germination.

Watering is reduced to once a day for weeks after germination.

UNIT 24 SITE SELECTION AND LAND PREPARATION FOR GROWING LEAF VEGETABLES

CHOOSING A SITE FOR A VEGETABLE GARDEN

There are many factors to be considered when choosing a site for a vegetable garden.

The following are some of them:

- ♠ water supply
- ♠ type of soil
- ♠ nearness to home or school
- ♠ nearness to market

LAND PREPARATION

Land preparation for leaf vegetable growing include:

- clearing the site for field beds
- making a fence to protect the vegetables from animals
- tilling the land to a depth of 20cm
- breaking large lumps of soil
- marking out bed. A bed should be 1 metre in width. It can be of any length. The length of the bed depends on availability of land and amount of vegetables to be produced.
- spreading compost or farmyard manure or fertilizer over the bed
- raking the manure and fertilizer into the soil
- levelling the ground

UNIT 25 TRANSPLANTING LEAF VEGETABLES

TRANSPLANTING VEGETABLE SEEDLINGS

Most leaf vegetable seedlings are ready for transplanting in about 4 to 5 weeks after sowing. This is when most seedlings have reached recommended size or height of 10 to 15 centimetres.

Seedlings should be transplanted late in the afternoon on cool, cloudy or rainy day so that they do not wilt.

Seedlings are hardened-off before transplanting.

Hardening-off is done by reducing the frequency of watering seedlings to once per day for a period of 1 to 2 weeks before transplanting. The seedlings can be left without watering for the last 2 to 3 days before transplanting

RECOMMENDED SPACING FOR SOME LEAF VEGETABLES

vegetable	spacing(cm)	
	between rows	between plants
cabbage	50	50
rape	30	50
bonongwe (Amaranthus)	30	30
mustard	45	60
Chinese cabbage	45	60
lettuce	30	30

The steps to follow when transplanting leaf vegetable seedlings are as follows:

- water the nursery beds thoroughly
- water the field beds thoroughly
- mark out the planting holes at the right distances in a straight line in the field beds
- dig holes in the positions marked
- lift the seedlings out of the nursery bed with as much soil as possible around the roots and place them in an open container
- place the seedling carefully into planting hole without bending the roots
- fill the holes with soil up to the collar mark of the seedlings. Press the soil around the plant firmly and gently with fingers.
- mulch the beds
- water the beds

UNIT 26 FIELD MANAGEMENT PRACTICES FOR LEAF VEGETABLES

MANAGEMENT PRACTICES FOR VEGETABLES IN FIELD BEDS

The transplanted seedling must be properly taken care of for them to survive and develop to maturity.

The following are some of the management practices:

- Mulching
- Watering
- Weeding
- Supplying
- Fertilizer or manure application
- Disease and pest control
- Harvesting leaf vegetables

MULCHING

Place the mulch at 5-7cm away from the seedlings to prevent termites or other ants from damaging the seedlings.

IMPORTANCE OF MULCHING

- Reduces weed growth by suffocating its seedlings
- conserves the soil moisture by decreasing the evaporation of water from the soil surface.
- decreases soil erosion by protecting the soil surface from contact by raindrops
- controls the soil temperature
- adds the plant foods to the soil when it decomposes
- reduces the spread of diseases by controlling the splashes (when it rains) of soil particles that contain disease causing organisms.

WATERING

- water the transplanted seedlings twice a day, in the morning and late afternoon.
- as seedlings are getting old reduce the frequency to once a day.
- during the dry season, frequency of watering should be increased to avoid wilting of vegetables

IMPORTANCE OF WATERING

- dissolves the plant food (nutrients)
- makes the plant absorb the nutrients from the soil and transports them to the leaves.
- makes plants to manufacture their food since water is one of the main components required in the process of food making
- enables the plants to transport the manufactured food to all other parts of a plant
- cools down the plants when it is very hot through transpiration

WEEDING

- Weed on a sunny day so that weeds can dry up and die
- Weeding can be done using trowel, handfork or small hoes, weeds close the vegetable plants should be uprooted. Mulch beds after weeding to supress weed growth

IMPORTANCE OF WEEDING

- Reduces insect and disease attack
- reduces competition for plants nutrients, air, sunlight, water, space between vegetable plants and weeds
- promotes production of quality leaf vegetables
- loosens the soil allowing more water to infiltrate and air to circulate freely

SUPPLYING

Replacement of dead vegetable plants should be done within a week of transplanting.

IMPORTANCE OF SUPPLYING

- Maintains correct plant population in order to increase productivity

FERTILIZER/MANURE APPLICATION

- make holes at 5-10cm away from the planting station
- apply 8g of CAN or Urea fertilizer per station or half teaspoon per station

IMPORTANCE OF MANURE OR FERTILIZER

- for development of green leaves
- for development of juicy leaves
- for fast growth of the vegetables

DISEASE AND PEST CONTROL

DISEASES OF LEAF VEGETABLES AND THEIR CONTROL

Disease	Their signs	control
Damping off	• seedlings appear water soaked at ground level and they collapse	• avoid over watering and dense planting • bury the diseased plants • spray the recommended chemicals

Leaf spot	• small yellowish or brown spots on leaves causing the older leaves to face off	• use clean seed, crop rotation, field hygiene, spray a chemical called chlorothanil or Daconil at 2g in 1 litre of water
Leaf bright	• Brown-black spot with a yellow margin on older leaves, stems and petioles	• use clean seed, crop rotation, field hygiene • spray with the recommended chemicals
Black leg fungus	• red-brown spots on the leaves, root decay	• treat the seeds before sowing • spray with the recommended chemicals • crop rotation
Black-rot	• blackening of the vascular tissues causing blockage of water supply, yellow v-shaped spots with white threads of fungi on the lower surface	• seed treatment • crop rotation • crop hygiene • grow crops in cool season
Downy mildew	• young plants develop irregular brown or white spots with white threads of fungi on the lower surface	• spray with Mancozel (Dithane m45) at the rate of 2g in 1 litre of water
Heart rot	• the whole plant rots	• spray with recommended chemicals • sterilize the beds before sowing • apply ash on the leaves • crop hygiene

PESTS OF LEAF VEGETABLES AND THEIR CONTROL

Pest	Type of damage	control
Aphids	• sucks the leaf sap causing leaves to curve inside and wilting	• introduce lady bird beetle • spray actellic 50EC at 1 litre of water • use of trap crops such as milk weed which attracts aphid away from vegetables
Cutworms	• cut the stem at ground level	• Sterilizing the soil by either burning or use chemicals
Caterpillars	• feed on leaves and tender stems of leaves	• spray Carbaryl
Grasshoppers	• feed on leaves and stem of vegetable seedlings	• spray Carbaryl • weeding
Nematodes	• swelling on the roots	• practice crop rotation

Mole crickets	• cut the leaves at ground level	• dig them up
Leaf eating beetles	• chew the leaves and feed on roots	• pick them up • spray malanthion or Carbaryl or cypermethrin

Chemicals should be applied and allowed a period of 2 weeks before harvesting.

Apply chemicals when pests exist in the field beds.

IMPORTANCE OF PEST AND DISEASE CONTROL

- prevents transmission of diseases
- prevents destruction of the leaves
- promotes fast growth of the plants
- increases vegetable yields
- improves quality

HARVESTING LEAF VEGETABLES

- harvest vegetables before they develop tough fibres or when the head is firm in case of cabbage
- harvest early in the morning when the crop still has some moisture
- use a sharp knife cutting the leaf stock at an angle
- keep the produce in fresh condition
- harvest leaf vegetables regularly

IMPORTANCE OF HARVESTING LEAF VEGETABLES AT THE RIGHT TIME

- more leaf is produced
- flowering is delayed
- tender leaves are harvested

UNIT 27 IMPORTANCE OF RABBITS

IMPORTANCE OF RABBITS

- provide meat for the people
- they produce and grow faster than other animals such as goats, sheep or pigs
- they produce manure for crop production
- they are a good source of income to farmers after selling
- they are easy to feed as they can feed on kitchen leftovers
- their hair is used as a raw material for making woollen clothes
- they require small space

BREEDS OF RABBITS

There are different breeds of rabbits.

These are:

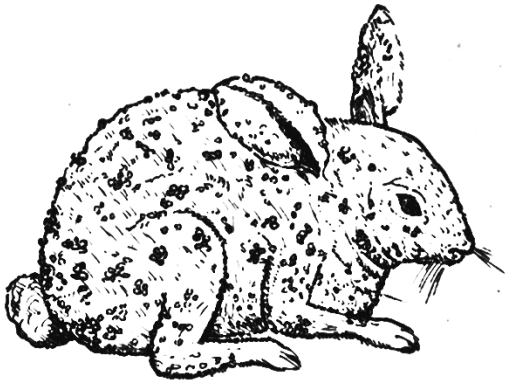
- Angora
- California
- New Zealand White
- Flemish Giant

The recommended breeds in Malawi are New Zealand White and California.

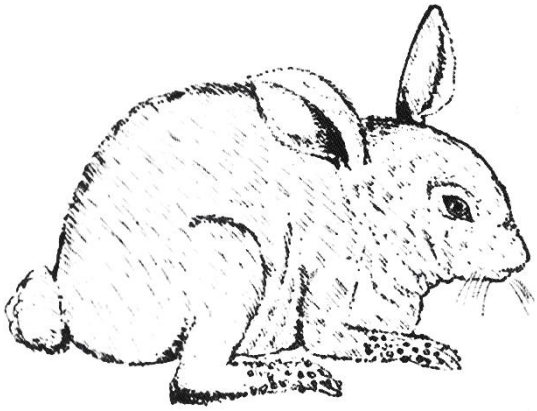
These two breeds are able to adapt to different conditions and systems of keeping rabbits.

CHARACTERISTICS OF RABBIT BREEDS

1. California Black
   - it is small in size, weighs about 3.5kg to 4.5kg when mature
   - it produces more offsprings
   - it is black in colour

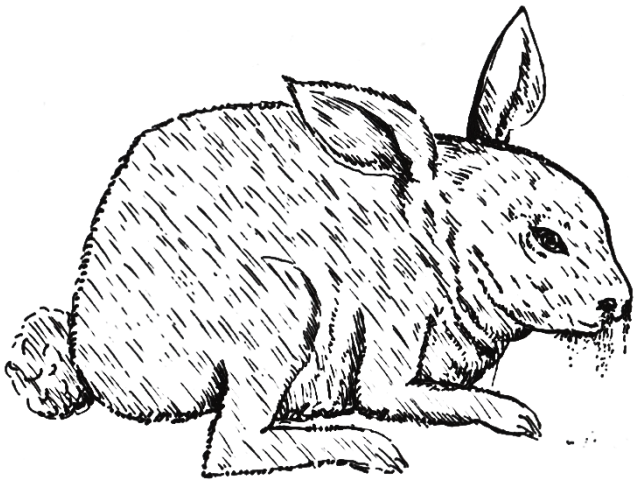


2. New Zealand White
   - it is big and weighs about 4kg to 5kg when mature
   - it produces more offsprings
   - it is white in colour



3. Flemish Giant

- it is very big and weighs about 5kg to 6kg when mature
- it does not produce a lot of offsprings
- it is grey in colour



UNIT 28 HOUSING AND FEEDING RABBITS

HOUSING RABBITS

Rabbits need to be properly housed for increased production. A good rabbit house protects the rabbits from enemies such as dogs, cats and snakes. It also protects rabbits from bad weather.

There are different ways of housing rabbits such as:

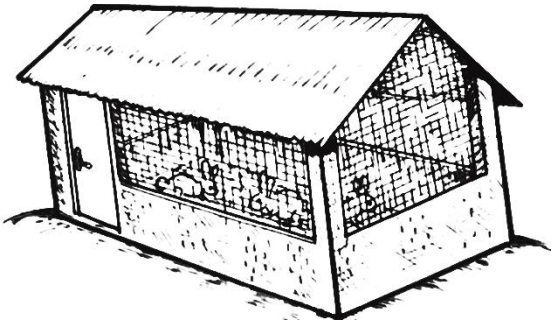
1. Pole and thatch khola

It is made of poles and thatched with grass. The khola is raised 1m above the ground for hygienic reasons. This reduces infestation of maggots and worms. Rabbits are also unable to burrow the ground and hide. The floor or bottom of the khola should have holes big enough for droppings to fall through and small enough for young ones not to fall through. A wire mesh or flat mesh can be put on the floor if the floor has big spaces. This keeps the khola well ventilated and self cleaned.



2. Deep litter khola

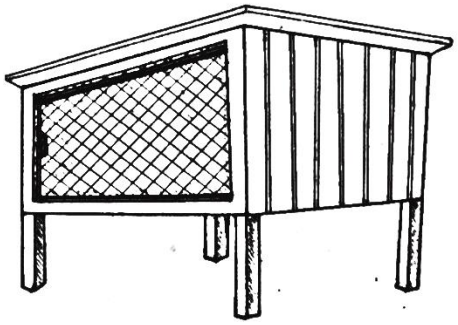
Constructed using bricks or stones. The roof is thatched with grass or iron sheets. Make sure that there is enough space for each rabbit. Provide bedding materials such as wood shavings to a depth of 7.5 cm as litter. The deep litter khola should have clean and dry litter to prevent infestation of maggots.



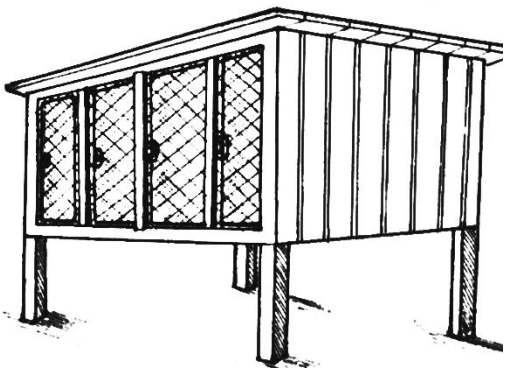
3. Hutches

Can be constructed using wood or bamboos. Hutches can be divided into individual cages. Hutches should be easily transportable if need be. Does, bucks and weaners have different cages. A cage for a buck is slightly larger than a doe's. This is to accommodate a buck and doe when placed in a buck's cage for mating.

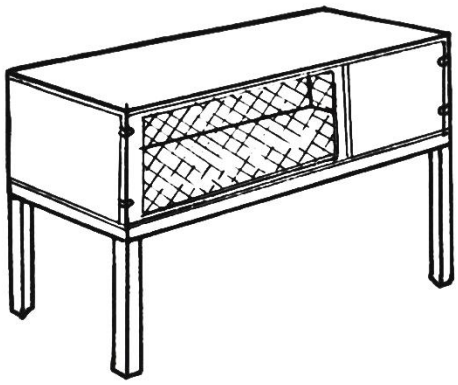
Single hutch for a doe



Hutch for weaners



Single hutch for a buck



FEEDING RABBITS

Rabbits are easier to feed largely because of their small bodies. They can be fed on food which otherwise would be thrown away by a household. They are an example of animals that do not compete with humans for food, such that a farmer is unlikely to face the problems in supplying food to rabbits. Proper feeding is a key to successful rabbit production.

Rabbits kept in hatches and kholas are totally dependent on the keeper for the feed.

Rabbits prefer fresh feed materials such as carrots, potato vines, cabbage and ground haulms, elephant grass, banana leaves, mwanaaligone, Tridax (Kwakhwaniwa). Green grass should also be fed to rabbits daily in addition to other feeds. A balanced feed should be prepared or bought and fed to rabbits at all times.

THE FOLLOWING GUIDELINES CAN BE USED TO PREPARE FEED FOR RABBITS:

COMMON CONCENTRATE FEED STUFFS AND HOW TO MIX THEM

Group A sun flower cake or groundnut cake

Group B boiled and dried beans or cotton seed cake

Group C maize, rice, sorghum or millet, (meal or bran)

Group D dried cassava or dried sweet potatoes

HOW TO MIX

1. mix 4 cups of group C with 1 cup of group A
2. mix 3 cups of group C with 2 cups of group B
3. mix 2 cups of group D with 2 cups of group B and 1 cup of group A

NB any suitable container can be used instead of a cup.

Grain products should be put in heavy feeding troughs which rabbits cannot trip over. Plant materials

such as grass can be hanged (suspended off the ground or floor) in the cage as rabbits do not eat spoiled feed

Over feeding should be avoided especially green feeds because they have plenty of water which will make the belly of rabbits to be filed with water resulting in low growth.

One way of noticing a hungry rabbit is that it comes to meet the farmer when approaching the khola.

WATER

Provide clean water to rabbits at all times.

A low supply of water will affect feed intake, growth and production of milk in rabbits.

Water should be put in heavy containers so that they are not tripped over by rabbits.

If rabbits are given large amounts large of dry feeds increase the supply of water.

UNIT 29 DISEASE AND PARASITE CONTROL IN RABBITS

RABBIT DISEASES

Rabbits are attacked by several diseases.

The table below shows some of the diseases, their causes, signs, prevention and treatment.

Name of disease	**Causes**	**Signs**	**Prevention**	**Treatment**
Coccidiosis	Protozoa	• Lack of appetite • Dullness of rabbits • Severe diarrhoea • Dehydration • Rapid death	• Keep khola or cage dry all the times	• Coccidiostats in feed or drinking water
Colds (snuffles Disease)	• Bacteria • Virus	• Sneezing • Mucus discharge from nostrils	• Isolate sick rabbits • Avoid overcrowding of rabbits • Good ventilation • General hygiene	• Antibiotics in drinking water
Rabbit pox	• virus	• small blisters on the skin	• vaccinate young rabbits goal against rabbits pox	• Treat the sores with appropriate drugs

Sores hocks	• bacteria	• sores on feet	• Avoid putting rabbits in rough floors especially floors made of interwoven wire or very thin wire	• Treat the sore with antibiotic ointment

Other diseases that may attack rabbits are tuberculosis, rabies and ear cancer.

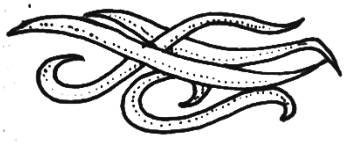
Rabbits which die from unknown causes should be removed and burnt.

PARASITES

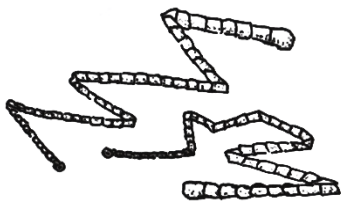
Rabbits are attacked by external and internal parasites.

INTERNAL PARASITE

Parasites	**Damage caused**	**Prevention**	**Treatment**
Tape worm	• Suck digested feed • Rabbits lose weight	• Cleanliness of houses • Keep feeding and dry	• Use piperazine or any deworming
Round worm	• Suck digested food • Rabbits lose weight	• Clean the house • Change wet litters	• Use piperazine
coccidia	• Attacks the lining of the liver and intestine • Severe diarrhoea (diarrhoea may be blood stained)	• Keep house or cage clean	• Coccidiostats



Round worms



Tape worms

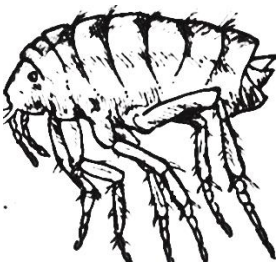
EXTERNAL PARASITES

Some of the external parasites that attack rabbits include: ear mites, fleas and lice.

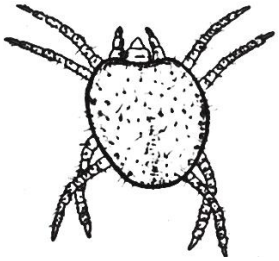
These suck blood and the rabbits may lose hair (fur) and cause irritation to the skin.

Ear mite can cause a disease called ear cancer.

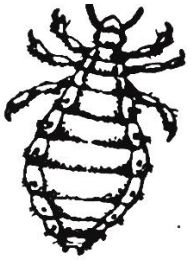
External parasites can generally be controlled by cleanliness of rabbit houses or cages.



Flea



Mite



Louse

UNIT 30 IMPORTANCE AND SYSTEMS OF AGROFORESTRY

MEANING OF AGROFORESTRY

The term "agroforestry" is formed by combining two original words of "agronomy" and "forestry". Therefore, the term "agroforestry" means the growing of arable crops together with trees on the same piece of land.

TYPES OF AGROFORESTY

Agroforestry is classified into three main types as follows:

- Silvoarable
- silvopasture
- forest farming

Silvoarable
Mixing trees with arable or horticultural crops such as maize, sorghum, beans, cotton, groundnuts, cabbages, tomato and carrots.

Silvopasture
Mixing trees with pastures or grass for grazing livestock.

Forest farming
Cultivating high value products within the forested area:

Medicine, botanical decoratives, handcrafts, food as well.

SYSTEMS OF AGROFORESTRY

The following are some of the agroforestry systems practiced in Malawi:

- Folder banks
- Live fence
- Improved fallows
- Dispersed tree planting
- Alley cropping

Folder banks

This involves planting trees used as feed for livestock alternated with arable crops.

The tree are frequently pruned to feed livestock.

Live fence

This involves planting trees and shrubs along the boundaries of arable crops.

Some of these trees may produce agroforestry products like fruits, timber and firewood.

Improved fallows

This involves growing legume trees on an arable land which is under fallow.

This increases organic matter and improves soil structure and fertility.

Dispersed tree planting

This involves planting certain types of trees at random with arable crops.

Alley cropping

This involves planting rows of trees alternated with rows of arable crops.

IMPORTANCE OF AGROFORESTRY

- The leaves fall and add nutrients to the soil
- Improving soil fertility and crop yields
- Legume leaves are rich in nitrogen
- Roots of leguminous trees fix nitrogen
- Providing food for livestock
- Controlling soil erosion and water run off on steep slopes
- Providing fuel wood, timber or poles for buildings

- Providing protection
- Improving food security
- Source of medicine

CHARACTERISTICS OF AGROFORESTRY TREE SPECIES

- Ability to accommodate other crops
- Ability to improve soil fertility
- High nutritive value
- Edible fruits
- Ability to generate
- Medicinal value

Written by Zikomo Masese Banda

REFERENCE

MIE (2008) Agriculture Teachers' Guide for Standard 7, Domasi; MIE

WRITTEN BY ZIKOMO MASESE BANDA