KCSE Agriculture Syllabus

GENERAL OBJECTIVES

The Secondary Agriculture course aims to:

1. develop an understanding of agriculture and its importance to the family and the nation

2. promote interest in agriculture as an industry and create awareness of opportunities existing in agriculture and related sectors.

3. demonstrate that farming is a dignified and profitable occupation

4. enhance skills needed in carrying out agricultural practices

5. provide a background for further studies in agriculture

6. develop self-reliance, resourcefulness and problem solving abilities in agriculture

7. develop occupational outlook in agriculture

8. enable schools to take an active part in national development through agricultural activities

9. create awareness of the role of agriculture in industrial and technological development

10, enhance understanding of the role of technology and industrialization in agricultural development

11. promote agricultural activities which enhance environmental conservation

12. promote consciousness of health promoting activities in agricultural production.

AGRICULTURE SYLLABUS

FORM I

1.0.0 Introduction to Agriculture (8 Lessons)

2.0.0 Factors Influencing Agriculture (24 Lessons)

3.0.0. Farm Tools And Equipment (7 Lessons)

4.0.0 Crop Production I (Land Preparation) (7 Lessons)

5.0.0 Water Supply, Irrigation And Drainage (10 Lessons)

6.0.0 Soil Fertility I (Organic Manures) (6 Lessons)

7.0.0 Livestock Production I (Common Breeds) (7 Lessons)

8.0.0 Agricultural Economics I (Basic Concepts and Farm Records) (7 Lessons).

1.0.0 INTRODUCTION (8 LESSONS)

1.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) define agriculture

b) state the main branches of agriculture

c) describe farming systems

d) explain the role of agriculture in the economy and demonstrate an appreciation of its importance to the country

e) demonstrate an appreciation for the wide and varied opportunities in agriculture.

CONTENT:

1.2.1 Definition of agriculture

1.2.2 Branches of agriculture

Crop-farming (Arable farming)

i) Field crops

ii) Horticulture

- Floriculture (flower farming)

- Olericulture (vegetable farming)

- Pomoculture (fruit farming)

Livestock farming

i) Pastoralism - mammalian livestock farming

ii) Fish farming (Aquaculture)

iii) Apiculture (Bee keeping)

iv) Poultry keeping

Agricultural economics

Agricultural engineering

1.2.3 Systems of farming

• Extensive

• Intensive

• Large scale farming

• Small scale farming

Note: Study each of the above systems under:

- Meaning

- Advantages

- Disadvantages

1.2.4 Methods of farming

• Mixed farming

• Nomadic pastoralism

• Shifting cultivation

• Organic farming

• Agroforestry

Note: Learners should be reminded that any of the above methods can be subsistence or commercial

1.2.5 Roles of agriculture in the economy

• Food supply

• Source of employment

• Foreign exchange earner

• Source of raw materials for industries

• Provision of market for industrial goods

• Source of capital

2.0.0 FACTORS INFLUENCING AGRICULTURE (24 LESSONS)

2.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) explain the human factors influencing agriculture

b) explain biotic factors influencing agriculture

c) explain how climatic factors influence agriculture

d) define soil

e) describe the process of soil formation

1) describe soil profile

g) determine soil constituents

i classify soils by physical characteristics

i) explain chemical properties of soils

j) relate crop and livestock distribution to soils in different regions.

CONTENT:

2.2.1 Human factors

• Levels of education and technology

• Health - HIV/AIDS and health in general

• Economy (include liberalization)

• Transport and communication

• Market forces (local and international)

• Government policy

• Cultural and religious beliefs

2.2.2 Biotic Factors

• Pests

• Parasites

• Decomposers

• Pathogens

• Predators

• Pollinators

• Nitrogen fixing bacteria

2.2.3 Climatic Factors

Rainfall

- intensity

- reliability

- quantity

- distribution

• Temperature

- How topography and altitude affect temperature

- How temperature influences crop and livestock

• Wind

- Evapotranspiraton

- Lodging

- Pollination

- Seed dispersal

- Soil erosion (note section 21.2.1)

• Light

- Intensity

- Duration - long, neutral and short day plants

- Wavelength

Note: Each factor to be discussed with respect to the following:

- Land potentiality
- Crop production
- Livestock production
- Crop and livestock distribution in Kenya

Edaphic factors

• Definition of soil

• Soil formation

• Soil profile

- Definition
- Characteristics of different soil layers
- Difference between soil formed in situ and depositions
- Soil depth and its influence on crop production

• Soil constituents

- Constituents (demonstrate presence of each)
- importance of each constituent

• Physical properties of soil

i) Soil structure

- Definition
- Types
- Influence on crop production

ii) Soil texture

- definition
- soil textural classification_

- influences on crop growth and production, porosity, capillarity, drainage and water retention capacity.

iii) Soil colour

Chemical properties of soil

- Soil pH

- pH influence on crop growth and production

- Effects of pH on mineral availability.

3.0.0 FARM TOOLS AND EQUIPMENT (7 LESSONS)

3.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) identify various farm tools and equipment

b) name parts of various farm tools and equipment

c) describe the use of various tools and equipment

d) carry out maintenance practices on tools and equipment

e) demonstrate an appreciation for care and maintenance of tools.

CONTENT:

3.2.1 Garden tools and equipment

3.2.2 Workshop tools and equipment

• Woodwork tools and equipment

• Metalwork tools and equipment

3.2.3 Livestock production tools and equipment

3 2 4 Plumbing tools and equipment

3.2.5 Masonry tools and equipment

Note: Study the above tools under the following headings:

- Name and uses

- Parts and uses

- Maintenance practices

Note: (see Appendix I for list of tools and equipment to be studied).

4.0.0 CROP PRODUCTION I (LAND PREPARATION) (7 LESSONS)

4.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) explain the importance of land preparation

b) describe the various types of cultivation

c) relate each cultivation operation to correct tools and or implements

d) prepare a piece of land ready for crop production.

CONTENT:

4.2.1 Land preparation

Definition

Importance

4.2.2 Operations in land preparation

Clearing land before cultivation

- Importance (include clearing as a method of land reclamation)

- Methods and equipment

Primary cultivation

- Definition and importance Timing

- Choice of tools and implements

Secondary cultivation

- Definition and importance

- Number of operations

- Correct tools and implement for different operations

- Relating final tilth to the intended planting material

Tertiary operations

- Ridging

- Rolling

- Levelling

Note: For each type:

- give reasons

- explain how it is carried out

Sub-soiling

- Meaning

- Importance

- Equipment used

4.2.3 Minimum tillage

Definition

Importance

Practices.

5.0.0 WATER SUPPLY, IRRIGATION AND DRAINAGE (10 LESSONS)

5.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) state the sources of water for the farm

b) describe collection, storage, pumping, and conveyance of water;

c) describe water treatment and explain its importance

d) define irrigation

e) explain the importance of irrigation

f) describe methods of irrigating land

g) list the equipment used in irrigation

h) grow a crop through irrigation

i) carry out maintenance on irrigation equipment and facilities

j) define drainage

k) explain the importance of drainage

I) describe the methods of drainage

m) explain how agricultural activities pollute water and how this can be prevented

n) demonstrate an appreciation for clean water in farming and life in general.

5.2.0 Content

5.2.1 Water supply

• Sources of water

• Collection and storage of water

• Pumps and pumping

• Conveyance of water

- Piping: - types of pipes

- Choice of pipes

- Canals

- Transportation in containers

• **Water treatment**

-Meaning

- Methods

- Importance

• Uses of water on the farm

5.2.2 Irrigation

Definition

• Importance (include irrigation as a method of land reclamation)

• Methods

- surface

- sub-surface

- overhead

- drip

Note: Discuss advantages and disadvantages of each method

• Maintenance practices of each irrigation system

5.2.3 Project on crop production through arty method of irrigation

5.2.4 Drainage

• Definition

• Importance (include as a method of land reclamation)

• Methods of drainage

- Surface

- Sub-surface

- Pumping

- Planting of appropriate trees

5.2.5 Water Pollution

• Meaning

• Agricultural practices that pollute water

• Methods of pollution prevention and control.

6.0.0 SOIL FERTILITY I (ORGANIC MANURES) (6 LESSONS)

6.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) define soil fertility

b) explain how soil fertility can be maintained

c) describe how soil loses fertility

d) define and distinguish organic matter, manure and humus

e) explain the importance of organic matter in the soil

0 describe the different organic manures

g) prepare compost manure;

h) demonstrate a caring attitude towards soil.

6.2.1 Soil fertility

• Definition

• How soil loses fertility Maintenance of soil fertility

6.2.2 Organic Manure

• organic matter and humus

• importance of organic matter in the soil

• types of organic manures Green manure

- Farm-yard manure

- Compost manure

Note: For each type, describe its preparation, advantages and disadvantages and use

6.2.3 Compost manure:

• Meaning

• Materials used and materials to avoid

• Preparation methods and procedure

- Heap

- Pit.

7.0.0 LIVESTOCK PRODUCTION I (COMMON BREEDS) (7 LESSONS)

7.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) name various livestock species

b) define the terms livestock, breed and type

c) describe the various breed characteristics

d) state the origin of various livestock breeds

e) classify the various breeds into types name the external parts various livestock specie

g) demonstrate an appreciation of the socio-economic of livestock.

CONTENT:

7.2.1 Importance of livestock

7.2.2 Livestock species Cattle

- Cattle
  - Exotic
  - Indigenous
- Goats
- Sheep
- Pigs
- Poultry (chicken)
- Rabbits
- Camels

Discuss each under the folio

- Breed origin and character Type of each breed

• External parts of each livestock species

• Typical conformation

7.2.3 Terms used to describe livestock in different species by age, se. and use.

8.0.0 AGRICULTURAL ECONOMICS I (BASIC CONCERPTS AND FARM RECORDS) (7 LESSONS)

8.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) define economics and agricultural economics

b) explain basic concepts of economics

c) describe the importance agricultural economics

d) explain the importance of farm records

e) describe the different types of farm records

1) keep farm records.

CONTENT:

8.2.1 Definition

• Economics

• Agricultural Economics

8.2.2 Basic Concepts of Economics

• Scarcity

• Preferences and choice Opportunity cost

8.2.3 Uses of farm records

8.2.4 Types of farm records

• Breeding Feeding

• Production

• Health

• Field operations

• Inventory

• Labour

• Marketing

FORM II AGRICULTURE SYLLABUS.

9.0.0 Soil Fertility II (Inorganic Fertilizers) (12 Lessons)

10.0.0 Crop Production II (Planting) (16 Lessons)

11.0.0 Crop Production III (Nursery Practices) (16 Lessons)

12.0.0 Crop Production IV (Field Practices) (14 Lessons)

13.0.0 Crop Production V (Vegetables) (16 Lessons)

14.0.0 Livestock Health I (Introduction) (16 Lessons)

15.0.0 Livestock Health II (Parasites) (16 Lessons)

16.0.0 Livestock Production II (Nutrition) (12 Lessons)

Agriculture Encyclopaedia

9.0.0 SOIL FERTILITY II (INORGANIC FERTILIZERS) (12 LESSONS)

9.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) list the essential elements

b) classify the essential elements

c) state the role of each macro- nutrient

d) describe the deficiency symptoms of the macro-nutrients

e) identify and classify fertilizers describe the properties of various fertilizers

g) describe soil sampling and testing procedures

h) use appropriate methods of fertilizer application

i) ca1culate fertilizer application rates

j) explain how soil acidity and alkalinity affect crop production.

CONTENT:

9.2.1 Essential elements

Macro-nutrients

- carbon, hydrogen and oxygen

- fertilizer elements (N, P, K)

- liming elements (Ca, Mg, S)

Role of macro-nutrients in plant growth

Deficiency symptoms of macro-nutrients in crops

Micro-nutrients

9.2.2 Inorganic fertilizers

Classification of fertilizers

Identification of fertilizers

Properties of fertilizers

Methods of fertilizer application

Determination of fertilizer rates

9.2.3 Soil sampling

Meaning

Soil sampling methods and procedures

Sites to avoid

Preparation and Procedure of sending soil for testing

9.2.4 Soil testing

Meaning

Importance

Testing for pH

How soil pH affects crop production

Note: Learners to make a table showing optimum pH range for various crops with the help of the teacher.

10.0.0 CROP PRODUCTION II (PLANTING) (16 LESSONS)

10.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) state the correct planting materials for various crops

b) select and prepare planting materials

c) determine the optimum time of planting

d) state the factors which determine the depth of planting

e) describe the planting procedures for different crops

f) state the factors that determine seed rate, spacing and plant population

g) calculate plant population

h) demonstrate an appreciation for economical use of land.

CONTENT:

10.2.1 Types of planting materials

Seeds

- Description

-Advantages

- Disadvantages

Vegetative materials

- Description

- Advantages

- Disadvantages

Plant parts used for vegetative propagation

- Slips
- Splits
- Bulbils
- Crowns
- Suckers
- Tubers
- Vines
- Cuttings and setts

10.2.2 Selection of planting materials Suitability to ecological conditions (use maize hybrids and coffee varieties as examples)

Purity

Germination percentage

Certified seeds

10.2.3 Preparation of planting materials

Breaking dormancy

Disease and pest control/seed dressing

Seed innoculation

Chitting

Note: Give appropriate crop for each Practice

10.2.4 Planting

Timing

-Factors to consider

-Advantages of timely planting

Methods of planting

- Broadcasting

- Row planting

- Oversowing (refer to pastures- 25.2.1)

-Undersowing

Note: Give appropriate crop for each method

10.2.5 Plant population

spacing

- factors to consider

seedrates

- factors to consider

calculation of plant population

10.2.6 Depth of planting

factors to consider

Note: Learners should:

- carry out the above practices

- develop a table showing spacing for different local crops

11.0.0 CROP PRODUCTION III (NURSERY PRACTICES) (16 LESSONS)

11.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) describe a nursery bed

b) distinguish between a nursery bed, a seedling bed and a seed bed

c) state the importance of a nursery bed

d) select a suitable site for a nursery

e) prepare a nursery bed fl manage a nursery bed

g) transplant crops from a nursery

h) bud a seedling

i) graft a seedling

j) explain the importance, budding, grafting, layering and tissue culture

k) describe damage caused by animals on tree seedlings and how to prevent it.

11.2.1 Nursery bed

Definition

Difference between a nursery bed, seedling bed and a seed bed

Importance

Site selection

Nursery establishment

i) Vegetable nursery

ii) Tree nursery

iii) Vegetative propagation nursery (tea as an example)

use of sleeves and other innovations for growing young plants

making and using seedling boxes for growing young plants

reparation of rooting medium

preparation of cuttings

11.2.2 Routine management in raising seedlings

Seed drilling

Mulching

Watering

Shading

Pricking out

Hardening off

Weed control

Pest control

Disease control

11.2.3 Budding

Meaning

Methods and procedure

Appropriate plants

Appropriate tools and materials

Note: Learners to practice budding of orange scions on lemon root-stocks or other appropriate plants.

11.2.4 Grafting

Meaning

Methods and procedure

Appropriate plants

Appropriate tools and materials

Note: Learners to practice grafting on appropriate fruit trees importance of budding and grafting

11.2.5 Importance of budding and grafting

11.2.6 Layering

Methods

Importance

Appropriate crops/plants for layering

Materials used in layering

11.2.7 Tissue culture for crop propagation

11.2.8 Transplanting of vegetable seedlings from nursery to seedbed

Timing

Procedure and precautions

11.2.9 Transplanting of tree seedlings

Timing

Digging appropriate holes

Planting including firming and watering

Protecting the seedlings after transplanting

- Shading

- Damage caused by animals on tree seedlings and how to prevent it.

12.0.0 CROP PRODUCTION IV (FIELD PRACTICES)(14 LESSONS)

12.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) define crop rotation

b) state the importance of crop rotation

c) draw a crop rotation programme

d) distinguish terms used in crop farming

e) state the importance of mulching in crop production

f) describe the importance of various field practices in crop production

g) carry out various field practices

h) state the correct stage for harvesting various crops

i) describe harvesting practices for various crops.

12.1.0 Specific Objectives

12.2.1 Crop rotation

Definition

Importance

Factors influencing crop rotation

Rotational programmes

12.2.2 Terms used in crop production

Monocropping

Intercropping Mixed cropping

12.2.3 Mulching

Meaning

Importance Types of mulching materials

- organic

- inorganic

Advantages and disadvantages of mulching materials

12.2.4 Routine field practices

Thinning

Rogueing

Gapping

Training/staking/propping

Pruning:

i) Tea - table formation and maintenance

ii) Coffee

- single and multiple stem.

-capping

-de-suckering

-changing cycles

(iii) Banana stool management

(iv) Pyrethrum

- cutting back

Earthing up

Crop protection:

- Weed control

- Pests and disease control (see unit 22 and 23)

Note: Study each of the above under

- Importance
- Timing
- Appropriate crops

12.2.5 Harvesting

Stage and timing of harvesting

Methods of harvesting

Precautions during harvesting

12,.2.6 Post - harvest practices

Threshing/shelling

Drying

Cleaning

Sorting and grading

Dusting

Packaging

12.2.7 Storage

Importance

Types of storage

Preparation of store .

13.0.0 CROP PRODUCTION V (VEGETABLES) (16 LESSONS)

13.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) grow a vegetable crop from nursery establishment to harvesting

b) keep crop production records

c) market farm produce

d) demonstrate an appreciation of agriculture as an economically lucrative activity.

13.2.1 Vegetable crops

Tomatoes - use varieties that require pruning and staking.

Carrots

Onions

Cabbages/kales

Note:

- Each student should grow at least one of the above crops keeping all the necessary records

- The teacher should organise the class in such a way that there are

students growing each of the crops

- Class discussions should be organised so that students tell and demonstrate to each other their work in the different vegetable crops. Discussion may be held at the crop plots for students to observe.

- The teacher may organise common nurseries for students growing tomatoes, cabbages/kales and onions. However, all students should actively participate in all nursery establishment and management practices.

- Topics 12.00 and 13.00 should be carried out concurrently as theory and practical.

14.0.0 LIVESTOCK HEALTH I (INTRODUCTION TO LIVESTOCK HEALTH) (8 LESSONS)

14.1.0 Specific objectives

By the end of the topic, the learner should be able to:

a) define health and disease

b) describe signs of sickness in animals

c) state the predisposing of livestock diseases

d) categorize animal diseases

e) carry out disease control practices

f) state the importance of maintaining livestock healthy

g) demonstrate a caring attitude towards livestock.

14.2.1 Health and disease Definitions

• Definitions

• Importance of keeping livestock healthy

• Pre-disposing factors of livestock diseases

• Signs of ill -health in livestock

14.2.2 Classification of livestock diseases by cause

14.2.3 General methods of disease control

14.2.4 Appropriate methods of handling livestock.

15.0.0 LIVESTOCK HEALTH II (PARASITES) (16 LESSONS)

15.1.0 Specific objectives

By the end of the topic, the learner should be able to:

a) describe host-parasite relationship

b) identify different parasites

c) describe the life-cycle of parasites

d) explain methods of parasite control in livestock.

15.2.1 Host - parasite relationship

effects of parasites on hosts

15.2.2 External parasites

Ticks

Tsetse flies

Mites

Lice

Fleas Keds

15.2.3 Internal parasites

Roundworms (Ascaris spp)

Tapeworms (Taenia spp)

Flukes (Fasciola spp)

Note:

The parasites in 15.2.2 and

15.2.3 should be studied under the following:

i) Identification

ii) Livestock species attacked

iii) Part(s) of livestock attacked or inhabited and mode of feeding

iv) Signs and symptoms of attack

Describe the life cycles of the following:

i) Roundworm (Ascaris spp.)

ii) Tapeworm (Taenia spp)

iii) Liver Fluke (Fasciola spp.)

iv) Ticks, appropriate examples of:

- one - host

- two - host

- three - host

Note:

Indicate whether soft or hard tick

State methods of parasite control giving appropriate example of a parasite for each method.

16.0.0 LIVESTOCK PRODUCTION II (NUTRITION) (12 LESSONS)

16.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) identify and classify livestock feeds

b) describe digestion and digestive systems of cattle pig and poultry

c) define terms used to express feed values

d) compute a livestock ration

e) prepare balanced ration for various livestock

f) demonstrate a caring attitude towards livestock.

l6.2.1 Livestock nutrition

Feeds and Feeding

- Identification
- classification of feeds
- Terms used in expressing feed values
- Computation of livestock rations
- Preparation of livestock rations

Digestive systems.

- Ruminant (cattle)
- Non-ruminant (pig and poultry)

Digestion in cattle, pig and poultry

16.2.2 Appropriate livestock handling techniques while feeding.

FORM III AGRICULTURE SYLLABUS

17.0.0 Livestock Production (Selecting and Breeding) (12 Lessons)

18.0.0 Livestock Production (Livestock Rearing) (10 Lessons)

19.0.0 Farm Structures (18 Lessons)

20.0.0 Agricultural Economics II (Land Tenure and Land Reform) (20 Lessons)

21.0.0 Soil and Water Conservation (19 Lessons)

22.0.0 Weeds and Weed Control (15 Lessons)

23.0.0 Crop Pests and Diseases (14 Lessons)

24.0.0 Crop Productivity VI (Field Practices II) (17 Lessons)

25.0.0 Forage Crops (9 Lessons)

26.0.0 Livestock Health III (Diseases) (20 Lessons)

Agriculture Encyclopaedia.

17.0.0 LIVESTOCK PRODUCTION III (SELECTION AND BREEDING) (12 LESSONS)

17.1.0 Specific Objectives

By the end of the topic the learner should be able to:

a) describe reproduction and

b) reproductive systems.

c) select breeding stock

d) describe breeding systems

e) identify signs of heat in livestocK

f) describe methods used in serving livestock

g) demonstrate a caring attitude towards livestock.

17.2.1 Reproduction and reproductive systems.

Cattle

Poultry

17.2.2 Selection:

meaning

Factors to consider in selecting a breeding stock

- Cattle
- Sheep
- Goats
- Pigs
- Camels Methods of selection

- mass selection

- contemporary comparison

- progeny testing

17.2.3 Breeding

Meaning

Terms used in breeding

- Dominant and recessive genes

- Heterosis (hybrid vigour)

- Epistasis

Breeding systems

- Cross-breeding

- Up-grading

- Inbreeding

- Line breeding

- Out-crossing

Note: Discuss under the headings:

- Definition

- Advantages

-Disadvantages

17.2.4 Signs of heat in:

Cattle

Pig

Rabbits

Note: Study the oestrus cycle of each of the above

17.2.5 Methods of service in livestock

Natural mating

Artificial insemination

Embryo transplant

Note: Discuss advantages and disadvantages of each.

17.2.6 Signs of parturition

Cattle

Pigs

Rabbits

Note: Learners to handle livestock in appropriate caring manner.

18.1.0 Specific Objectives

By the end of the topic the learner should be able to:

a) describe livestock rearing practices

b) earn out livestock rearing practices

c) demonstrate a caring attitude towards livestock.

18.2.1 Routine livestock rearing practices

Feeding practices

- Flushing
- Steaming up
- Creep feeding

Parasites and disease control practices

Vaccination

Deworming

Hoof trimming

Docking

Dipping/spraying

Dusting

Breeding practices

- Crutching
- Tupping and serving
- Raddling
- Ringing

Identification

Debeaking

Tooth clipping

Culling: Describe general methods and carry out practicals on:

- Cattle
- Poultry

Dehorning

Shearing

Castratio

- open
- closed
- caponization

Management during parturation:

- Pigs
- Cattle
- Sheep
- Goats
- Rabbits

18.2.2 Bee Keeping (Apiculture)

Importance

Colony

Siting of the apiary and hive

Stocking the bee hive

Management:

- Feeding

- Predator and pest control

Honey harvesting and processing

18.2.3 Fish Farming (aquaculture)

Importance

Types of fish kept in farm ponds

Management

Harvesting

Processing and preservation

18.2.4 Appropriate handling of livestock during routine management.

19.0.0 FARM STRUCTURES (18 LESSONS)

19.1.0 Specific Objectives

By the end of this topic, the learner should be able to:

a) describe parts of a building

b) identify materials for construction

c) describe various farm structures and their uses

d) describe siting of various structures

e) construct and maintain farm structures.

19.2.1 Farm buildings and structures

Siting

Parts of a building

- Foundation
- Wall
- Floor
- Roof

19.2.2 Livestock buildings and structures

Crushes

Dips

Spray race.

20.0.0 AGRICULTURAL ECONOMICS II (LAND TENURE AND LAND REFORM) (8 LESSONS)

20.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) define the term tenure

b) describe tenure systems

c) describe land reforms.

20.2.1 Land tenure

definition

tenure systems

i) individual

- Types
- Advantages and disadvantages

ii) collective

- Description
- Advantages

- Disadvantages

20.2.2 Land reforms

Definition

Types of reform and reasons for each

- Fragmentation
- Consolidation
- Adjudication
- Registration (Emphasize the importance of a title deed)
- Settlement and resettlement.

21.0.0 SOIL AND WATER CONSERVATION (19 LESSONS)

21.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) define soil erosion

b) explain the various factors that influence erosion

c) list the agents of erosion

d) describe the various types of erosion

e) describe various methods of erosion control

f) demonstrate a caring attitude towards soil and water

g) carry out soil erosion control measures

h) describe water harvesting and conservation techniques

i) describe micro-catchments and their uses.

j) Design and construct a micro-catchment

21.2.1 Soil erosion

Definition

Factors influencing erosion

- Land use and ground cover

- Topography - gradient and length of slope (horizontal and vertical intervals)

- Soil type and condition (Erodability)

- Rainfall intensity (Erosivity)

Agents of erosion

- Water

- Wind

- Human beings

- Animals

Types of erosion

i) Splash/rain drop

ii) Sheet

iii) Rill

iv) Gully

  - gully formation

  - types of gullies

v) Riverbank

vi) Solifluction

vii) Landslides

Soil erosion control

(i) Biological/cultural control

  - Grass strips

  - Cover crops

  - Grassed waterways

  - Contour farming and strip cropping

- Mulching

- Afforestation/reafforestation

(ii) Physical/structural controls

- Stone lines

- Filters/strip

- Trashlines

- Terraces - level, graded, broad, based, narrow- based, bench, fanya juu, fanya chini.

- Bunds

- Cut-off- drains/Diversion ditches

- Gabions/porous dams

- Ridging

21.2.2 Water harvesting

Roof catchment

Rock catchment

Weirs and dams

Ponds

Retention ditches/Level terraces

21.2.3 Micro- Catchments

Types

Laying out and construction methods

Uses

Note

- A local soil conservation officer to be contacted for necessary tools and demonstration of skills in establishing level and graded terraces

- Learners to practice using levelling boards, line and spirit level to develop conservation structures.

- Learners to carry out soil and water conservation work in and or out of school wherever appropriate.

22.0.0 WEEDS AND WEED CONTROL (15 LESSONS)

22.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) define a weed

b) identify& weeds

c) classify weeds

d) explain the characteristics which make the weeds competitive

e) describe ways of controlling weeds

f) state harmful effects of weeds

g) control weeds

h) exercise safety measures to oneself, to crops and to the environment while rolling weeds.

22.2.1 Weeds

Definition of weed

Weed identification and classification competitive ability of weeds (Appropriate examples for each ability)

Harmful effects of weeds (appropriate examples for each effect) (See Appendix II for weeds to be studied)

22.2.2 Weed control methods

Chemical weed control:

- Classes of herbicides
- Methods of application
- Safety measures in use of chemicals

Mechanical weed control

Cultural weed control

Biological weed control

Legislative control

3.0.0 CROP PESTS AND DISEASES(14 LESSONS)

23.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) define pest and disease

b) state the main causes of crop diseases

c) describe the harmful effects of crop pests and diseases

d) identify and classify some of the common pests and diseases

e) carry out general disease and pest control measures

f) demonstrate a caring attitude towards the environment while controlling pests and diseases.

23.2.1 Pests

Definition

Classification of pests:

- Mode of feeding
- Crops attacked
- Stage of growth of crop attacked
- Field and storage pests

Identification of common pests

Harmful effects of pests

Pest control measures

23.2.2 Diseases

Definition

Classification of diseases according to cause

Identification of common diseases

Disease control

Harmful effects of diseases

Disease control measures (see appendices Ill and IV for pests and diseases to be studied)

Note: Remind learners of safety in mixing, using and storing of chemicals including container disposal as in unit 2200).

24.0.0 CROP PRODUCTIVITY IV (FIELD PRACTICES II) (17 LESSONS)

24.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) describe management practices in crop production

b) carry out management practices for a given crop

c) demonstrate an appreciation of agriculture as an economically lucrative activity.

24.2.1 Production of

(a) Maize/millet/sorghum

(b) Beans

Discuss under the following:-

Meaning of hybrids, composites and cultivars

Selecting best hybrids, composites or cultivars for a given climatic region.

Raising of a maize/sorghum /millet and bean crop from seed bed preparation to harvesting

Keeping records in production of maize/sorghum/millet and beans

24.2.2 Rice production

Land preparation

Water control

Use of flooding in rice field

Fertilizer application

Weed control

24.2.3 Harvesting of the following crops :

Cotton

Pyrethrum

Sugarcane

Tea

Coffee

Under the following

Stage of harvesting

Method and procedure of harvesting

Precautions in harvesting

Note:

Compare cost of production with value of product for maize/sorghum/millet and beans

Discuss why there is a loss or a profit and improvement needed.

25.0.0 FORAGE CROPS (9 LESSONS)

25.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) define and classify pastures

b) identify forage crops

c) describe the ecological requirements of forage crops

d) describe the establishment and management of pastures and fodder

e) describe forage utilization and conservation.

25.2.1 Pastures

Definition

Classification

Establishment

Management

25.2.2 Utilization

Grazing systems

- Rotational

- Herding

Zero grazing

25.2.3 Fodder crops

Napier/bana grass

Guatemala grass

Sorghum

Kale

Edible cana

Lucerne

Clovers

Desmodium

Manigolds

Agroforestry trees/bushes used as fodder

Under the following:

- Ecological requirements

- Establishment and management

- Production per unit area

- Utilization

Hay making

Silage making

Standing hay.

26.0.0 LIVESTOCK HEALTH III (DISEASES) (20 LESSONS)

26.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) describe causes and vectors of main livestock diseases

b) state the incubation period of the livestock diseases

c) describe the signs of each disease

d) state the predisposing factors where applicable

e) carry out simple control measures of livestock diseases

f) demonstrate a caring attitude towards livestock.

26.2.1 Protozoan diseases

East coast fever

Anaplasmosis

Coccidiosis

Trypanosomiasis (Nagana)

26.2.2 Bacterial diseases

Fowl typhoid

Foot rot

Contagious abortion (Brucellosis)

Scours

Black-quarter

Mastitis

Anthrax

Pneumonia

26.2.3 Viral diseases

Rinderpest

Foot and mouth

Newcastle

Fowl pox

Gumboro

African Swine fever

26.2.4 Nutritional diseases

Milk fever

Bloat

The above diseases should be studied under the following:

Animal species attacked

Cause/causal organism/agent and or vector

Predisposing factors (where applicable)

Incubation period (where applicable)

Signs and symptoms of disease

Simple control measures of the diseases

Note

- Learners to exercise care and use appropriate livestock handling practices

- Exercise care not to pollute the environment with chemicals.

FORM IV AGRICULTURE SYLLABUS.

27.0.0 Livestock Production V (Poultry) (25 Lessons)

28.0.0 Livestock Production VI (Cattle) (16 Lessons)

29.0.0 Farm Power and Machinery (18 Lessons)

30.0.0 Agricultural Economics III (Production Economics) (20 Lessons)

31.0.0 Agricultural Economics IV (Farm Accounts) (10 Lessons)

32.0.0 Agricultural Economics V(Agricultural Marketing and Organisations) (10 Lessons)

33.0.0 Agroforestry (10 Lessons)

Agriculture Encyclopaedia.

27.0.0 LIVESTOCK PRODUCTION V (POULTRY) (25 LESSONS)

27.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) identify parts of an egg

b) select eggs for incubation

c) identify suitable sources of chicks

d) describe broodiness and natural brooding

e) describe brooder and brooder management

f) describe conditions necessary for artificial incubation

g) describe rearing systems

h) describe the feeding for each age and category of poultry

i) identify stress and vices

j) state the causes of stress and vices in poultry

k) state the effects of vices and stress in poultry

l) state control measures of vices and stress

m) describe marketing of eggs and poultry meat

n) select, sort and grade eggs for marketing

o) demonstrate an appreciation of poultry production as an economically lucrative activity.

27.2.1 Parts of an egg

27.2.2 Incubation

Meaning

Selection of eggs for incubation

Natural incubation

- Signs of broodiness in poultry

- Preparation and management of natural incubation

Artificial incubation

- Management of the incubator

27.2.3 Sources of chicks

27.2.4 Brooding

Meaning

Natural brooding

Artificial brooding

- Brooder and brooder management
- Conditions
- Equipment
- Management of:

i) layers

ii) broilers

27.2.5 Rearing systems

Extensive

-Free range

Semi - intensive

- Fold system

Intensive

- Deep litter
- Battery cage system

Note: Include advantages and disadvantages of each system.

27.2.6 Chicken feeding

Broilers

Layers

27.2.7 Stress and vices in chicken.

Identification

Causes

Control

27.2.8 Marketing

eggs - include, grading of eggs for marketing

meat.

28.0.0 LIVESTOCK PRODUCTION VI (CATTLE) (16 Lessons)

28.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) raise young stock

b) demonstrate a caring attitude towards livestock

c) describe milk by its components

d) describe milk secretion and let - down

e) milk using correct procedure and technique

f) describe marketing of beef cattle and milk

g) Demonstrate an appreciation of cattle production as an economically lucrative activity.

28.2.1 Raising young stock

- Feeding
- Weaning
- Housing
- Routine practices (see unit 18)

28.2.2 Milk and Milking

- Milk composition
- Milk secretion and let down
- Clean milk production

- Equipment and materials (include milking machine)

- Cleanliness of the milkman / milkwoman

- Milking procedure (by hand and by machine

- Milking techniques

• Dry cow therapy

28.2.3 Marketing of milk

28.2.4 Marketing beef cattle

Note: Learners to exercise care and use appropriate methods in handling livestock

29.0.0 FARM POWER AND MACHINERY (18 LESSONS)

29.1.0 Specific Objectives

By the end of the topic the learner should be able to:

a) describe various sources of power in the farm

b) describe various systems of a tractor

c) describe the various tractor implements, their uses and maintenance

d) describe the various animal drawn implements, their uses and maintenance

e) describe tractor service and maintenance practices.

29.2.1 Sources of power in the farm

Human

Animal

Wind

Water

Biomass

- Wood/charcoal

- Biogas

Fossil fuel

- Coal

- Petroleum

- Natural gas

Electrical

- Hydro

- Geothermal

- Nuclear

- Storage battery

Solar

29.2.2 Tractor Engine

Four stroke cycle engine

dieseL

petrol

Two stroke cycle engine

29.2.3 Systems of the tractor

Fuel system

Electrical

Ignition

Cooling

Lubrication

Transmission

- Clutch

- Gears

- Differential

- Final Drive

29.2.4 Tractor service maintenance

29.2.5 Tractor drawn implements, their uses and maintenance.

Attachment methods

i) One point hitch

- draw bar

ii) Three point hitch

- hydraulic

iii) Power take off (PT O)

Implements

i) Trailer

ii) Disc plough

iii) Mouldboard plough

iv) Harrows

- disc

plain

notched

- spike tooth

- spring tined

v) Sub - soilers

vi) Ridgers

Rotary tillers

Mowers

- Gyro

- Reciprocating

Planters and seeders

Cultivators

Sprayers

Harvesting machines

- grain

- root crops

- forage

Shellers

29.2.6 Animal drawn implements, uses and maintenance

• Ploughs

• Carts

• Ridgers

Note : Teacher should use local resources and diagrams. The school does not need to have tractor, tractor drawn implements, animals and animal drawn implements.

30.0.0 AGRICULTURAL ECONOMICS III (PRODUCTION ECONOMICS) (20 LESSONS)

30.1.0 Specific Objectives

By the end of the topic, the learner should be able to;

a) explain various parameters of national development

b) relate national development to agricultural production

c) state the factors of production and explain how each affects production

d) describe how the law of diminishing returns relates to agricultural production

e) describe agricultural planning and budgeting in a farm business state sources of agricultural support services

g) describe risks and uncertainties in farming

h) explain ways of adjusting to risks and uncertainties.

30.2.1 National income

Household - firm relationship

Gross Domestic product (GDP)

Gross National Product (GNP)

Per Capita Income

Contribution of agriculture to national development

30.2.2 Factors of production

Land

- Definition
- Methods of acquisition

Labour

- Definition
- Types
- Measures of labour
- Ways of increasing labour efficiency

Capital

- Definition
- Types
- Sources

Management

- Definition
- Role of a farm manager

Note: Emphasize that by law, a Kenyan can acquire land, settle, invest capital or work anywhere within the country.

30.2.3 Production function.

Increasing returns

Constant returns

Decreasing returns

30.2.4 Economic laws and principle

The law of diminishing returns

The law of substitution

The law of equi-marginal returns

Principle of profit maximization

30.2.5 Farm planning

meaning

factors to consider

steps

30.2.6 Farm budgeting

Definition

Importance

Types

-. Partial

- Complete

30.2.7 Agricultural services available to the farmer

30.2.8 Risks and uncertainties in farming

Meaning

Common risks and uncertainties

Ways of adjusting.

31.0.0 AGRICULTURAL ECONOMICS IV(FARM ACCOUNTS) (10 LESSONS)

31.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) state the importance of farm accounts

b) distinguish and describe the various financial documents and their uses

c) prepare and analyse financial statements

d) identify various books of accounts and their uses.

31.2.1 Financial documents and books of accounts

Financial documents

- Invoices
- Statements
- Receipts
- Delivery notes
- Purchase orders

Books of Accounts

- Ledger
- Journal
-Inventory
-Cash book

31.2.2 Financial statements

Cash analysts

Balance sheet

Profit and loss account.

32.0.0 AGRICULTURAL ECONOMICS V (AGRICULTURAL MARKETING AND ORGANISATIONS) (10 LESSONS)

32.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) define market and marketing

b) describe the various types of markets

c) describe how the law of supply and demand affects the prices of agricultural products

d) state various marketing functions, agents and institutions

e) identify problems in marketing of agricultural products

f) list various agricultural organizations -

g) describe the role of each of the agricultural organizations.

32.2.1 Market and marketing

32.2.2 Types of markets

32.2.3 Demand, supply and price theory

32.2.4 Marketing functions

32.2.5 Problems of marketing agricultural products and possible solutions

32.2.6 Marketing boards, agents and institutions

32.2.7 Co-operatives

• Formation

• Functions

32.2.8 Associations and unions

• Agricultural society of Kenya (ASK)

• Young Farmers Clubs (YFC)

• Kenya National Farmers Union (KNFU)

• Agricultural based Women groups.

33.0.0 AGROFORESTRY (10 LESSONS)

33.1.0 Specific Objectives

By the end of the topic, the learner should be able to:

a) define agro forestry

b) state the importance of agro forestry

c) describe various forms of agro forestry

d) explain the importance of trees

e) select appropriate trees for different uses

f) describe tree nursery management and transplanting

g) explain routine tree management

h) select appropriate sites for trees in the farm and other

i) describe various methods of tree harvesting.

33.2.1 Definition of agro forestry

forms of agro forestry

33.2.2 Importance of agro forestry

33.2.3 Importance of trees and shrubs

important trees and shrubs particular purposes

Trees and shrubs to avoid at certain sites and reasons

33.2.4 Tree nursery

types of nurseries

seed collection and preparation

nursery management

transplanting

Note: Refer to 11.00 nursery practices

33.2.5 Care and management of trees

Protection

Pruning and training

Grafting old trees

33.2.6 Agro forestry practices

Alley cropping

Multi-storey cropping

Woodlots in farms

33.2.7 Sites for agro forestry trees

Boundaries

Riverbanks

Terraces

Slopes

Homestead

33.2.8 Tree harvesting methods.