CHAPTER ONE

Introduction to Agriculture

Key Words	By the end of this chapter, you should be able to:
• Agriculture • Nomadic • Production • Subsistence • Commercial • Activities	• know the historical background of agriculture in terms of herding, the nomadic way of life, food gathering and hunting. • appreciate the value of agriculture to society and human being. • know the value of the farm as a production unit. • recognise the value of various farming systems and their socioeconomic impact in Uganda. • realise the importance of keeping records in agriculture. • appreciate the requirements of a career in agriculture and key principles of the labour act on the living conditions of the farm workers.

Competency: You should be able to understand the agricultural sector and the different opportunities it provides in Uganda.

Introduction

In this Chapter, you will be introduced to the opportunities and benefits of engaging in agricultural production activities. This will enable you to

identify possible careers that will enable you produce enough food and have enough income to live a comfortable life.

Developing an interest in agriculture can lead to a fulfilling career. Think about the different activities in agriculture and select those that appeal to you. For instance,

- Dairy farming
- Goat racing
- Fish farming
- Bee keeping
- Rabbit rearing
- Horse riding
- Poultry farming
- Cheese making
- Yoghurt making
- Pet veterinarian
- Animal health inspector
- Meat processing
- Apple growing
- Rice growing
- Banana growing
- Wine making
- Maize growing
- Millet growing
- Vegetable growing
- Pesticide applicator operator
- Plant biologist
- Night herdsman
- Fish pond maker
- Grain grader
- Soil laboratory technician
- Fungicide maker
- Fertilizer distributer
- Milk transporter
- Livestock feed maker
- Animal breeder
- Artificial inseminator
- Hoof trimmer
- Biotechnologist
- Genetic engineer
- Water engineer
- Farm water supply plumber
- Farm structure electrical technician
- Farm app designer
- Farm drone maker
- Soil chemist
- Agricultural engineer
- Cocoa making
- Coffee brewing
- Cotton ginning
- Tractor driving
- Agricultural science communicator
- Agricultural lawyer
- Plant doctor
- Pasta machine operator
- Agricultural journalist
- Sausage maker
- Irish potato grower
- Flower salesman
- Agricultural waste disposal technician
- Fruit and juice processor

Which of these appeal to you?

Engaging in any of these activities will lead you to a discovery of different opportunities in agriculture. What is the most common commodity people buy or sell on a daily basis in the market in your community? Have you ever imagined a day without food?

Historical Background to Agriculture in Uganda

People must have food to live. There are different ways of getting food. In Uganda, many years ago people used to get food through hunting and gathering. With time, people started growing crops and domesticated animals for a more reliable food supply. Before 1900, shifting cultivation and nomadic pastoralism were the main forms of agricultural production in Uganda. These have long been replaced by commercial farming on large scale production using fertilisers, machines, agrochemicals, and selling to the market beyond the local community.

Activity 1.1: Exploring agricultural activities in your community

You will need a notebook, pen and observation list

In pairs:

1. develop an observation list of agricultural activities and products in the community.
2. make a plan of your movement in the community.
3. carry out the visit, observe, identify and record agricultural products produced in your community and suggest their uses.
4. present your findings in class.
5. What do you say about the agricultural activities and products in your community?
6. compare agriculture and nomadism by completing the table below.

Table 1.1: Comparison of agriculture and nomadism

	What you know about it	Examples to show it	Definition
Agriculture			
Nomadism			

7. Extended work in groups: Identify the value of agriculture and the prospects for the future of agriculture in Uganda, regionally and globally.
8. Extended work in groups: Investigate the evolution and progress in development of agricultural activities in your community and other regions in Uganda.

The Value of Agriculture to the Community

Agriculture is the way of life for most people in Uganda. About 70% of the population is engaged in agriculture. It contributes about 25% to the national gross domestic product (GDP). Local agricultural production contributes 85% of the food consumed in Uganda.

Activity 1.2: Importance of agriculture to society

You will need a notebook and pen

1. Individually, write the names and occupations of about five family members within your location. Indicate how what they do for their income and livelihood directly or indirectly relates to agriculture.

(a)

(b)

(b)

Figure 1.2: Products from agriculture

Write in your exercise book the answers to the following questions.

1. a) Study the photographs above and name what you see.
   b) What role does agriculture play in relation to what is found in the photographs?
   c) Why is agriculture a main way of life for about 70 percent of the people in Uganda?

d) Explain five benefits Ugandan get from agriculture.

2. In groups, collect pictures/labels/samples and make posters showing the food and other products people get from crops and animals.
3. In pairs, rearrange the letters in the following table to find the crops and animals that you might get on farms in your community. How many other crops and animals can you think of? Write their names and what we benefit from them.

sowc	totocn
srohe	aet
scihkcne	fefoce
sfhi	nabana
ooesg	bacebga
ehpes	wappwa
	hilci
	ctuelte
	ganom
	ecir

Understanding Farming Systems in Uganda

Agriculture can be looked at as a production system where inputs are changed into products through a production process. The most important inputs include both natural and manmade sources. Examples of natural sources include water, sunshine and soil while examples of manmade sources include seeds, animals, fertilizers, agro chemicals, labour and machinery. Some operations that are involved in the agricultural production system include ploughing, digging, sowing, irrigation, weeding, crop care or protection and harvesting. While the outputs from the process include crops, wool, dairy, meat, hides, manure and poultry, among others. Therefore, a farm is a system with inputs, processes and outputs. A farming system is everything that the farmer does in farming under the existing climatic, socio and economic conditions of an area.

A farming system is a way of organising a farming enterprise. Systems vary widely depending on several factors.

Activity 1.3: The value of farming systems and their socioeconomic impact on Ugandans

You will need a notebook and pen

(a) (b) (c)

(d) (e)

(f) (g)

Figure 1.3: Different farming activities in Uganda

Table showing a farming system approach

Inputs	Processes	Outputs
Pastures, dairy cows, water	Feeding	Milk

1. In groups, answer the following questions in your exercise book.
   i) Study the photographs above and name what you see.
   ii) What farming system is shown in each of the photographs above?
   iii) Of what value is each of the farming system above?
   iv) What is the benefit of each farming system to the people shown in the pictures?
2. In groups, research on four different farming systems in Uganda including one used in your community. Take notes and report to the class on the:
   i) reasons for different systems in different regions.
   ii) the value of farming systems and their benefits to Ugandans.
3. In pairs or groups, draw a map of Uganda, do library or internet research and indicate the areas of crop and animal production.

Importance of Record Keeping in Agriculture

Record keeping is the act of writing down or documenting the activities you are involved in. In the past, people used to keep all their information in their heads. Today, this has changed because the quantity of information that needs to be kept is big. So there are special record books or computer programmes that may be used. Keeping records helps one to effectively run farm activities. These activities include planning, budgeting, implementing and evaluation of farm activities.

Figure 1.4: Farm RECORDS OFFICE

Keeping Records on the Farm

Record keeping is an important aspect in all human activities. We all keep records of some kind. This is because all of us need to keep track of what happened. Farm records are essential to good farm management. Planning decisions rely on information concerning expenditure, use of stock and productivity. Without records, the farmer has to make decisions based on guesses. This makes farming activities to be risky. The exact records kept depend on the farming enterprise or activity.

Case Study of Porena and Minu

Read the following case study and do the activity that follows

Porena and Minu operated a small scale business. They sold fruits of all varieties: pineapples, oranges, passion fruit, bananas, watermelons, grapes and many others. They received their supplies directly from the farmers. To ensure good operation of the business, they tried very hard to keep good records.

They maintained a supplies book that recorded all the supplies from each supplier. In the supplies book, they recorded the quantities supplied and the amount of money the supplies were worth. In addition, they maintained a cashbook that recorded the cash sales. They recorded any credit given to their customers on small pieces of paper but recorded all the business expenses in a hard cover book.

Porena and Minu were very happy with the record keeping. One day the pieces of paper on which they recorded the creditors disappeared. They were not able to tell how much they owed their creditors. This had taken two seasons. Yet each season many people carried out business with them. Porena and Minu found it difficult to recall off their head or memory the exact person they gave credit and the total amount they owed. So they kept on wondering who was to pay then and how much.

In 2018, the Uganda Revenue Authority (URA) staff visited Minu and Porena's vegetable and fruit business and demanded to see their records. They had no clean book to present. The data was difficult to understand. On some pages, you could find phone numbers with names in the column of total amount. Minu and Porena were surprised to hear that vegetable and fruit sellers were required to maintain records for inspection by the URA staff. The URA staff gave them one month to prepare the records. They did not know where to begin.

Activity 1.4: understanding the importance of record keeping in agriculture

You will need a notebook and a pen

1. Individually or as a group read the case study above.
   i) What is it about?
   ii) How effective in your opinion are Minu and Porena at record keeping?

iii) Identify the records that Minu and Porena should maintain to meet the requirements of the URA.
iv) If you were Minu and Porena, what methods could you employ to improve the system they have?

2. In groups, prepare and present a role play of a conversation between two farmers, one who recognises the importance of keeping records and one who does not. Who of the farmers is likely to be more productive? Give reasons for your answer.
3. In pairs, identify and write the kind of information found in each of the types of record in the table below.

Type of record	Information shown
Production records	
Financial records	
Health records	
Breeding records	

4. Discuss the importance of keeping each kind of information in the records above.

Careers in Agriculture

Most young people wonder about their future. They want to be successful in something they enjoy doing. They want to have enough income to live a comfortable life. To achieve this, it requires good planning and preparation.

A career is an occupation undertaken for a significant period of a person's life and with opportunities for progress. It is the general direction of a person's life in terms of employment. A **Career** may be the sequence of jobs that a person holds to make a living. This may lead a person to have a good income and a better standard of living.

Careers in agriculture are grouped into pathways. **A pathway** is a group of careers with similar education, training and interests. There are several career pathways in agriculture including animal, crop, nutrition, agribusiness, conservation and technical systems.

Since you will probably spend the greater part of your adult life working, you will need to familiarise yourself with all kinds of career possibilities in

agriculture for you to realize where your interests lie so as to identify a career for better life.

Activity 1.5 Available career opportunities in agriculture

You will need a notebook and pen.

1. In groups, investigate and prepare a presentation on the:
   i) different agricultural careers and the appeal of each
   ii) working conditions of farm workers in relation to the provision of basic necessities provided within the agricultural sector.
2. Individually recall or go out in your community and identify;
   i) one individual doing a career in agriculture.
   ii) Find out how he/she made it, and the opportunities and challenges faced in doing that career.
   iii) Are there any other careers in agriculture? if so, list them.
   iv) Present your findings to the class.

Activity of Integration

Context

Most young people wonder about their future. They want to be successful in something they enjoy doing like the great celebrity you know in Uganda. They want to have enough income to live a comfortable life. They must have interest in those things that appeal to them. They look at opportunities and develop plans to achieve their desires. Agriculture has many such areas.

Support

Pictures of a goat farmer; cheese maker; pesticide applicator worker

Task

Identify a discipline in agriculture that you want to be successful in and write the opportunities and challenges involved.

CHAPTER TWO

Farm Tools, Equipment and Implements

Key Words	By the end of this chapter, you should be able to:
• Tools • Equipment • Implement • SI units • Safety standards • Hazard • Health standards • First aid • Husbandry practice	• identify tools used in the farm - garden tools, woodworking tools, metal tools, and the basic tools used for fencing, mechanics and farming activities. • demonstrate the skills of using farm tools and implements for better production. • show skill in using common measurement tools for length, volume, time and mass/weight. • express basic occupational safety and health standards in agriculture. • explain skills in applying the steps in giving first aid on the farm and during agricultural activities.

Competency: In order to ensure safety on the farm when carrying out agricultural activities, you should be able to use properly measurement tools, crop and animal tools, equipment, machines and implements.

Introduction

In this chapter you, you will be introduced to the farm tools, implements and machines used in taking measurements and carrying out the routine husbandry practices in crops and animals.

Once you have chosen a suitable site for your selected crop to grow or livestock to rear, you need the right tools to make work easy. There is need to prepare your planting site, restrain your animal, administer drugs, move materials from one site to another and many more practices. To do all this, you need to know the right tools, implements and equipment to use.

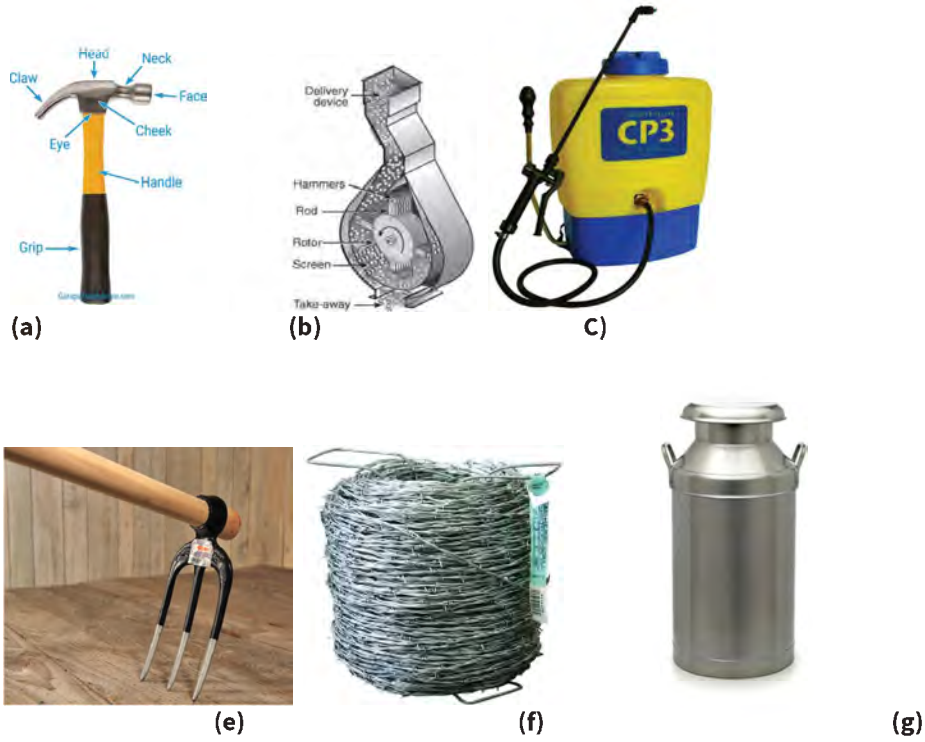

Figure 2.1 Common Farm Tools

Identifying Tools Used on the Farm

What is the name of the tools in Figure 2.1a and b? Where is each tool used? Did you know the names of the parts of each tool? Now look at Figure 2.1c, d, e, f and g. What does each tool do for farmers? You will realise that tools can be categorised based on the type of work they can be used for. These tools include garden tools, woodworking tools, metal tools, and the basic tools used for fencing, mechanics and animal handling. A wrong tool for the wrong job does not only waste time but causes irreparable damage both to the tool and work being done.

Activity 2.1: Farm tools

You will need a pen, notebook and drawing pad.

1. In pairs,
   i) categorise different farm and measurement tools provided according to their uses in: the garden; the workshop; animal husbandry; crop husbandry and building.
   ii) discuss how each tool is used. Compile a report to present in class.
2. In groups, visit the school workshop or a nearby farm, then;
   i) identify the common tools used.
   ii) list the functions of each tool.
3. Extended work in groups:
   i) Investigate the reasons for using different tools, equipment and machines in agricultural activities.
   ii) Identify career opportunities in manipulating these equipment and machines in agriculture.

Conversion of Units in Agriculture

All of us use measurement in some form on a daily basis. Some activities and professions depend on having competent measurement skills. The builders, farmers, veterinarians, crop breeders as well as processors and retailers of agricultural products, among others, need to efficiently calculate mass, length, time, area, volume and dilutions. A nursery bed

operator, for example, may need to calculate the length of wood required for making a seedbed box, the volume of soil to fill it and the amount of water needed to water the seedlings. Our ability to accurately measure the length of wood will save money and energy of carrying timber we may not need to use. However, the timber dealers use their own measurement and the nursery bed operator applies a different unit. This requires conversion of units. When you have two units, they must measure the same thing. For example, when you have "convert 2 metres into centimetres," both metres and centimetres measure length. If your unit measures two different things (like length and weight for example 2 metres and 2 grams), you cannot convert them. Only those measuring the same things can be converted. For example, if a bicycle is moving 10 kilometres per hour, how many metres does it travel in one minute?

Now you can practice conversion of units. Remember, you can only convert units that measure the same thing. In our example, we have units that measure length (kilometres and metres), and units that measure time (hours and minutes). Start with one pair and find the conversion between them. For example, 1 kilometre =1000 metres and 1 hour = 60 minutes. The metric system, also called the decimal system, is designed for easy conversion. To convert from one metric unit to another, you only have to work with round numbers: 10, 100, 1000, and so on.

Activity 2.2: Conversion of units on farm tools and equipment

You will need a calculator or computer and conversion table

1. In pairs, convert the following measurements in agriculture as required.
   i) 6290 millimetres into centimetres
   ii) 780 centimetres to metres
   iii) 53,000 metres into decimetres
   iv) 40,000 decametres into kilometres
   v) 360 seconds into minutes
   vi) 180 minutes to hours
   vii) 2.3 kilometres to metres

viii) 59 centimetres to metres
ix) 1 hour and 10 minute to seconds

2. Individually, practice converting different measurements in agriculture into the Standard Units (SI units):
   i) A vegetable garden of 226 cm by 64 cm
   ii) A path to the farm with 25 tiles each 40cm wide
   iii) A tractor ploughs an acre of land in 1 hour 20 minutes
   iv) Milking a cow in 4 minutes
   v) 600
   vi) cm^3 of milk in a bottle of drinking water to litres

3. In groups:
   i) select a tool of your own choice to carry out the tasks assigned to you by the teacher from the following:
      - finding the size of the flower bed;
      - finding the length of the science laboratory;
      - weighing a bucket of beans;
      - finding the amount of water in a watering can;
      - finding the size of the hole dug for planting a banana sucker or mango tree;
      - determining the period required to fill a 500ml bottle with water from a water source
   ii) Describe the procedure you followed in carrying out the task to the class.
   iii) What did you learn from the task and presentations?

Proper Use of Farm Tools and Equipment in Carrying Out Farm Practices

Farm tools are equipment used in agricultural processes such as land preparation. They include, among others, the hand hoe, rake, slasher, axe and panga. *Farm equipment* is any kind of machinery used on a farm to help with farming. The best known example is a tractor. There are also many *farm implements. How do you use these farm tools and equipment?* Tools and equipment are designed to perform a particular task on the farm. For instance, a hoe is used to dig soil. Therefore, when choosing a

tool, make sure you use the right tool for the right job. Farm tools, equipment and implements should be kept free from rust and free of slippery oils. There is also need for a budget for replacing broken and worn out tools.

Rules regarding farm tools, equipment and implements:

i) Organise them in a store, tray, or other system, with each tool stored in its own place. This way, you can easily see at a glance which one you might need for a task you want to carry out.
ii) Wipe each tool clean after use.
iii) Never throw tools or equipment into a tool box. Carefully place each tool or equipment into its proper place in the store or tray.
iv) Never leave tools or equipment lying about, especially on the floor.
v) Record each tool when getting it from the store and on returning it. Report damaged, broken and lost tools as you return from doing the task.
vi) Always put tools or equipment away at the end of the activity, even if you are working in a closed room. They must be maintained and kept safely.

Basic Occupational Safety, Health Standards and First Aid during Agricultural Activities

Some of the farm tools, equipment and implements have cutting blades, sharp edges or piercing ends which may cause harm or danger to the users. In order to prevent accidents on the farm, it is important to handle the farm tools, equipment and implements carefully by taking precautions. Manufacturers always provide information on safe use of tools and equipment which you must read, understand and put into practice.

Practicing safety precautions during agriculture activities on the farm may require you to do some of the following:

- Wear protective gear under all circumstances.
- Ensure that you use tools, equipment and implements only when you are physically and emotionally sound. All your gears should be worn securely to avoid entanglements with tools and equipment you are using.

- Cover sharp edges and piercing ends to avoid causing harm to yourself and others.
- The right person should use the right tool, equipment and implement for the right job. For example, as a **Farm Equipment Mechanic and Service Technician,** you can do the following tasks:

Farm Equipment Mechanic and Service Technician

a) Record details of repairs made and parts used.
b) Reassemble machines and equipment following repair, testing operation and making adjustments as necessary.
c) Maintain, repair, and overhaul farm machinery and vehicles, such as tractors, harvesters, and irrigation systems.
d) Dismantle defective machines for repair, using hand tools.
e) Repair or replace defective parts, using hand tools, milling and woodworking machines, lathes, welding equipment, grinders, or saws.
f) Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.
g) Install and repair agricultural irrigation, plumbing, and sprinkler systems.
h) Calculate bills according to record of repairs made, labour, time used, and parts used.

Accidents in Our Lives

Accidents may happen anywhere and at any time. You should therefore be careful when carrying out agricultural activities. But in case of an accident, we should be able to give first aid.

First aid is the first assistance given to someone who has had an accident or injury in order to save life or promote recovery. It is the first the emergency or immediate care you should provide when a person is injured or ill until full medical treatment is available.

Activity 2.3: Administering first aid

1. In groups, imagine a student in your class has got an accident while using farm tools.
   i) Design a role play and act out how you can provide first aid to the injured.
   ii) Make a presentation to be displayed in your school to ensure safety on the farm.
2. In groups, research on First Aid and the basic occupational safety and health standards in agriculture by listening to an invited speaker or using the internet or other resources. Present the group's findings about what all agriculture workers should know and be able to do with respect to paying attention to health and safety plus carrying out First Aid.

Activity of Integration

Context

If you go out to the community, what do you see? You will see farmers, fields and farms. Oh! The list continues, and trees, hedges, birds, insects…It is a long list! Farmers rear animals like goats, poultry, sheep, cattle and pigs and they grow crops such as maize, millet, bananas, coffee, sorghum, tea, tobacco, cotton, sugarcanes, fruit and vegetables. They use tools, equipment and implements. The people wear things like gumboots, caps, gloves and overall coats.

Farms are wonderful places to visit. You may have been to a farm on a school visit in your Primary school or on a trip with your parents. Some of you may even be living on a farm. It is important to remember that farms are work places and so there might be dangerous objects. You need to take care.

Supports

Task

You have been asked to establish a small garden for growing vegetables to replace the flowerbeds in the school compound. Using the information in this chapter, make a presentation on what you should do.