



Ministry of Education
and Sports

HOME-STUDY LEARNING

SENIOR
1

AGRICULTURE

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This material has been developed as a home-study intervention for schools during the lockdown caused by the COVID-19 pandemic to support continuity of learning.

Therefore, this material is restricted from being reproduced for any commercial gains.

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FOREWORD

Following the outbreak of the COVID-19 pandemic, government of Uganda closed all schools and other educational institutions to minimize the spread of the coronavirus. This has affected more than 36,314 primary schools, 3129 secondary schools, 430,778 teachers and 12,777,390 learners.

The COVID-19 outbreak and subsequent closure of all has had drastically impacted on learning especially curriculum coverage, loss of interest in education and learner readiness in case schools open. This could result in massive rates of learner dropouts due to unwanted pregnancies and lack of school fees among others.

To mitigate the impact of the pandemic on the education system in Uganda, the Ministry of Education and Sports (MoES) constituted a Sector Response Taskforce (SRT) to strengthen the sector's preparedness and response measures. The SRT and National Curriculum Development Centre developed print home-study materials, radio and television scripts for some selected subjects for all learners from Pre-Primary to Advanced Level. The materials will enhance continued learning and learning for progression during this period of the lockdown, and will still be relevant when schools resume.

The materials focused on critical competences in all subjects in the curricula to enable the learners to achieve without the teachers' guidance. Therefore effort should be made for all learners to access and use these materials during the lockdown. Similarly, teachers are advised to get these materials in order to plan appropriately for further learning when schools resume, while parents/guardians need to ensure that their children access copies of these materials and use them appropriately. I recognise the effort of National Curriculum Development Centre in responding to this emergency through appropriate guidance and the timely development of these home study materials. I recommend them for use by all learners during the lockdown.



Alex Kakooza
Permanent Secretary
Ministry of Education and Sports

ACKNOWLEDGEMENTS

National Curriculum Development Centre (NCDC) would like to express its appreciation to all those who worked tirelessly towards the production of home-study materials for Pre-Primary, Primary and Secondary Levels of Education during the COVID-19 lockdown in Uganda.

The Centre appreciates the contribution from all those who guided the development of these materials to make sure they are of quality; Development partners - SESIL, Save the Children and UNICEF; all the Panel members of the various subjects; sister institutions - UNEB and DES for their valuable contributions.

NCDC takes the responsibility for any shortcomings that might be identified in this publication and welcomes suggestions for improvement. The comments and suggestions may be communicated to NCDC through P.O. Box 7002 Kampala or email admin@ncdc.go.ug or by visiting our website at <http://ncdc.go.ug/node/13>.



Grace K. Baguma
Director,
National Curriculum Development Centre

ABOUT THIS BOOKLET

Dear learner, you are welcome to this home-study package. This content focuses on critical competences in the syllabus.

The content is organised into lesson units. Each unit has lesson activities, summary notes and assessment activities. Some lessons have projects that you need to carry out at home during this period. You are free to use other reference materials to get more information for specific topics.

Seek guidance from people at home who are knowledgeable to clarify in case of a challenge. The knowledge you can acquire from this content can be supplemented with other learning options that may be offered on radio, television, newspaper learning programmes. More learning materials can also be accessed by visiting our website at www.ncdc.go.ug or ncdc-go-ug.digital/. You can access the website using an internet enabled computer or mobile phone.

We encourage you to present your work to your class teacher when schools resume so that your teacher is able to know what you learned during the time you have been away from school. This will form part of your assessment. Your teacher will also assess the assignments you will have done and do corrections where you might not have done it right.

The content has been developed with full awareness of the home learning environment without direct supervision of the teacher. The methods, examples and activities used in the materials have been carefully selected to facilitate continuity of learning.

You are therefore in charge of your own learning. You need to give yourself favourable time for learning. This material can as well be used beyond the home-study situation. Keep it for reference anytime.

Develop your learning timetable to cater for continuity of learning and other responsibilities given to you at home.

Enjoy learning



Term 1

TOPIC 1: INTRODUCTIN TO AGRICULTURE

Lesson 1: Keeping Records in Agriculture

Learning outcomes

By the end of the lesson, you should be able to:

- i) state the importance of keeping records on the farm.
- ii) describe the different types of farm records.

Materials that you will need in this lesson.

Pen, pencil, notebook, ruler, sample of farm records (if possible)

Introduction

You have probably at one time heard your teacher saying that *“Failure to plan is planning to fail”*. This happens to the farmers too! For effective planning in agriculture, you should always use well-kept records at the farm.

In the rapidly changing world and commercial agriculture, record keeping is very important than ever before. This is because agriculture records are not only needed by the farmer but even other external bodies. These could be the funding bodies, Revenue collection authorities and banks from which farmers acquire loans.

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 the head. 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 in effective running of farm activities. The activities include planning, budgeting, implementing and evaluation of farm activities.

For a record to be appropriate, it should bear the date and title. It should also be accurate, easy to interpret, complete and concise.

Records kept at the farm vary from farm to farm depending on the size and number of activities at the farm. Therefore, there are a various record kept in agriculture which include the following;

Crop records showing the variety of crops grown, yield, agronomic practices applied etc.

Labour records showing the amount and cost of labour used and its allocation.

Production records showing number of animals kept, milk yield, eggs, beef, quantity harvested.

Calving records show the date of calving, weight of the calf, condition of the calf etc.

Health records show disease incidences, treatment given etc.

Breeding records show information like date of insemination, sire, dam, expected date of calving etc.

Financial records show items like profits, losses, total sales, daily income etc.

Records of farm history showing when and how the farm started, its initiators and the resources that were available by then.

Inventory records show all physical properties on a farm with their value.

Feeding records show the amount of feeds given daily, type of feeds, cost of feeds and type of animals fed.

Activity 1

Visit any nearby wholesale traders/poultry farmers or any Commercial farmers in your community.

- a) Ask them politely to tell you the type of records they keep in their businesses/farms.
- b) Go ahead to ask them for reasons why they keep records in their businesses.
(Note their responses in your notebook and you will present them to your teacher when schools resume to operate)
- c) In reference to the knowledge you acquired on the **types of records**. Design/prepare formats of the following farm records on a poultry farm;
 - i) Health records
 - ii) Production records
 - iii) Labour records
 - iv) Feeding records

Lesson 2: Career Opportunities in Agriculture

Learning Outcome

By the end of the lesson, you should be able to describe the available job opportunities or Occupations in Agriculture.

Materials that you'll need in this lesson

pen, notebook

Introduction

Do you know anyone in your community or village who has done something to earn a living for the last 10 years? Am sure you do! Then that's what a career is.

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.

Therefore, agriculture has different career (employment) opportunities for you and me. You probably know most of them and some may sound quite new.

Careers in Agriculture



Can you identify the activities taking place in the above pictures?

*Agriculture Teacher; Agricultural Economist; Agronomist; Agricultural Engineer; Animal Nutritionist; **Politician**; Animal Physiologist; Agriculture Educator; Biochemist; Biometrician; Biosystems Engineer; Biosafety Scientist; Botanist (Plant Biologist); Climatologist; Entomologist; **Farmer**; Ecologist; Remote Engineer; Environmental Scientist; Fisheries Scientist; Food Scientist; Florist; Food Processor; **Educator**; Food Inspector; Food Safety Specialist; Forester; Forage Agronomist; Geneticist; Horticulturist; Hydrologist; Logging Engineer; Agronomist; Marine Scientist; Molecular Biologist; Animal Surgeon; Naturalist; Nutritionist/Dietician; Aquaculturist; Plant Pathologist; Plant Physiologist; Postharvest Technologist; Range Manager; Sensing Specialist; Soil Scientist; Toxicologist; Turf Scientist; Veterinarian; Viticulturist; Agriculture Writer; Weed Scientist; Wildlife Scientist; Biologist; Wood Scientist; Plant Breeder; Pesticide Applicator Dairy Operator Dairy Scientist Feed Mill Operator Poultry Scientist; Molecular Biotechnologist; Meteorologist; Soil Physicist; Soil Chemist; **Sociologist**; Grain Grader; Poultry Inspector; Beekeeper; Agricultural Chemical Dealer; **Agricultural Journalist**; Agricultural Photographer; Agritourist Manager; Animal Pathologist; Beef Producer; Biological Engineer; Environmental Engineer; Ecologist; Epidemiologist; Farm Appraiser; Farm Manager; Fish Hatchery Manager; Floral Designer; Forest Ranger; Poultry Hatchery Manager; Nematologist; Green House Manager; Irrigation Specialist; **Agriculture Loan Officer**; Meat Scientist; Nursery Manager; Parasitology; Swine Producer; Agricultural Machine Welder; Surveyor; Waste Management Specialist; Water Specialist; Timber Dealer; Crop produce Dealer; Soil Conservationist; Agricultural Tax Consultant; Plant Clinical Doctor; Vegetable Farmer; Organic Farmer; Zoologist; **Agricultural Curriculum Specialist**;*

Can you identify the activities taking place in the above pictures?

List of some career's opportunity in agriculture

Activity 2

Individually, recall or go out in your community and identify;

- a. One individual doing a career in agriculture
- b. Find out how he/she made it, the opportunities and challenges faced in doing that career.
- c. Are there any other careers in agriculture? If so list them down

Term 2

TOPIC 1.2: FARM TOOLS, EQUIPMENT AND IMPLEMENTS

Lesson 1: Correct Use of Farm Tools and Equipment

Learning Outcome

By the end of the lesson, you should be able to:

- i) identify and describe the different farm tools and equipment.
- ii) select the correct farm tools and equipment for different farm operations.

Materials that you will need in this lesson.

hand hoe, watering can, tape measure, rake, wheel burrow, hand rake, spade, knapsack sprayer, garden fork, hammer, panga, rake, hand fork, hand trowel

Introduction

Did you know? *A wrong tool for the wrong job does not only waste time! But causes irreparable damage both to the tool and work being done.*

Once you have chosen a suitable site for your selected crop to grow or livestock to rear. You need 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.

These tools are of various categories. They include workshop tools, fencing tools, crop husbandry tools and animal husbandry tools.

Crop husbandry tools are commonly used on small farms for preparation of seedbeds. They can also be used in weeding, planting and harvesting of crops.

Workshop tools are of a wide range and are useful on the farm for building and construction. Some are used during repair and maintenance.

Animal husbandry tools are many and varied. These tools are used in a wide range of livestock management practices. These practices include castration, drenching, hoof trimming, spraying against ecto-Parasites etc.

Activity 1

Fill and complete the table below of farm tools and equipment

Tools	Name	Correct use	Category
			
	<p>Tape measure</p>		
			
			
			
			
			
			

 <p><small>shovel stock photo</small></p>			
			
			
			<p>Workshop tool</p>
			
			
			
			

		<p>To carry or transport loads on the farm</p>	
			
			
			
			
			

Lesson 2: Care and Maintenance of farm tools and equipment

Learning outcome

By the end of the lesson, you should be able to describe how different farm tools and equipment can be maintained.

Materials that you'll need in this lesson

pencil, notebook

Introduction

Years back when I was in my primary two, I saw my Uncle using a hoe to cut firewood. To me this looked normal not until when I started seeing the cutting edge of the hoe folding! Do you think my Uncle was using the hoe for the correct use? What was he supposed to use the hoe for?

Tools last longer when put to correct use and maintained appropriately. This reduces unnecessary expenses for replacement and constant repairs on tools.

Activity

1

As a senior one student, you have been invited to speak to these farmers. Write a speech that you would deliver to this audience of farmers.

Case study of farmers in Njojo village

Njojo village has about 210 farmers who majorly concentrate on vegetable growing. Each household bought a number of farm tools and equipment to be used in the farming business. These include hoes, rakes, knapsack sprayers, spades, garden forks, wheel burrows etc.

Surprisingly, the farmers do not clean these implements every after use. Besides, they do not carry out any repairs on those damaged or broken. After farm work, these tools are kept under trees which make them exposed to thieves and harsh weather.

I was able to notice a wheel burrow producing queer noise during movement. Some hoes, axes, slashers, secateurs and pangas had rusted. Tools used for cutting could no longer cut efficiently as they used to when still new.

Term 2

TOPIC 1.3: SOIL SCIENCE

Lesson 1: Soil formation by weathering process

Learning outcome

By the end of the lesson, you should be able to:

- i) describe the types of rock weathering.
- ii) identify different soil components.

Materials that you will need in this lesson

pencil, pen, notebook, soil samples, rocks, profile pit

Introduction

When you were young someone told you not to play in the soil. What is soil? Stated in the simplest form, soil is what plants grow in. Soil is the loose material on the Earth's surface above the solid rock. The thickness of soil varies greatly from place to place. At some point you find an outcrop with no soil at all. There is a bare rock. In other places the soil may be 0.5 or more meters deep.

To form soil, rocks are *weathered*.

Weathering is the breaking of rocks into small particles that form soil. There are three forms of weathering.

Physical weathering, chemical weathering and biological weathering contribute the mineral matter required in forming soil.

When soil particles are formed, they accumulate in an area. The vertical cross section through soil in an area is called a soil profile.

Most soils have four layers called horizons. The top soil is known as the A horizon. It is the top most layer covered with organic matter.

The subsoil is the B horizon. This is the second layer from top and is red brown in colour. It is where most leached minerals are found.

The weathering rocks is C horizons. It is made of loose pieces of rocks, broken off from big rocks.

The bed rock is the unweathered and consolidated mineral matter. It is at the bottom of the soil profile.

Activity

- a) What is soil composed of? Investigate a soil sample in your area to determine what it is made of.
- b) Identify the different types of rocks you find in your home area
- c) With the help of your pencil, pen and notebook or camera. Visit any nearby pit or place that has been excavated with a tractor.
- i) Draw and label the layers of the soil profile.
- d) State the observable characteristics of each layer in the profile.

Lesson 2: Practices of improving Soil Fertility

Learning outcome

By the end of the lesson, you should be able to demonstrate skills in improving soil fertility.

Materials that you'll need in this lesson

pencil, pen, notebook, cow dung or poultry droppings, artificial fertilizers if available (NPK, CAN, DAP)

Introduction

A fertile soil is one which is able to supply nutrients for crops to produce high yields. Not only producing high yields but also crops which look healthy and attractive.

There are a number of factors which contribute to a fertile soil. These factors include nutrient content of the soil, organic matter and **soil pH**. Soil Ph is the level at which the soils are acidic or alkaline. Others include soil structure, aeration, and drainage among others.

Farmers are always encouraged to keep their soils fertile. This ensures continuous production of high yields and healthy crops.

Organic and inorganic fertilizers are used to improve soil fertility. Organic fertilizers such as farm yard, compost and green manure improve aeration and workability of the soil.

Common inorganic fertilizers may include NPK, CAN, DAP, Sulphate of Ammonia among others. They are slightly expensive compared to organic manures but release nutrients to the soils in known concentrations.

The method of applying them may differ according to crop size and fertilizer type to use. These include bund placement, ring placement, contact placement, drilling. Even top dressing, broadcasting, foliar application and **fertigation** are other methods of fertilizer application.

Fertigation involves application of soluble fertilizers when mixed in irrigation water. This saves time since irrigation and fertilizer application is done at once.

But what should the farmers do to keep these soils fertile?

Activity

1

Read the passage below carefully.

Mr. Kabonge has been a banana grower in Masaka district since 1997. He says that banana growing has enabled him educate all his five children. Besides, he has also constructed a permanent house from banana sales.

Since 2016, the yields of banana per season reduced with damaged fruits and leaves. Mr. Kabonge claims that the banana plants are also characterized with stunted growth. Leaves also begin yellowing at a young stage and some wilting.

Some parts of the garden had experienced rills as a result of soil erosion. Unwanted types of thorny plants were also witnessed spread in different parts of the plantation.

He further informed that his soils were nearly black in colour at the start of this plantation. But currently the soils have lost the black colour and turned reddish.

- a) In your views, advise Mr. Kabonge on what he should do to improve his banana plantation.
- b) In your home garden or nearby garden. Seek permission to practice the methods of organic manure application and artificial fertilizers.

TOPIC 1.4: VEGETABLE GROWING

Lesson 1: Selection of vegetable crops to grow

Learning outcome

By the end of the lesson, you should be able to select an appropriate vegetable to grow.

Materials that you will need in this lesson

notebook, pen, any leafy vegetable

Introduction



Can you identify the vegetables in the above pictures?

Vegetable like Sukuma wiki or Kales are one of Kenya's most demanded green vegetables especially due to their nutritional value. The Kales business is extremely vibrant both in urban and rural areas. Selling Kales is very easy and offers you an opportunity to make a decent living. I will provide tips on how to succeed in the Kales business.

SUKUMA WIKI or *Kale* belongs to the *brassic*s family – a group of leafy vegetables that generally favour cooler climates. Kale is very easy to grow in a variety of climates but it tastes sweetest when it has just been kissed by frost.

Varieties of Sukuma wiki

Sukuma Siku Hybrid – Curled leaves, soft texture. Has good tolerance to Diamond Back Moth. Leaves have a good cooking flavor. Longer harvesting period (6-9 months). \ Sukuma siku hybrid kales

Marrow stem – Dark green leaves. Prefers cool climate with moderate to fairly heavy and well-distributed rainfall.

Thousand headed – Smaller leaves than Collard. It is slow growing compared to other varieties. Very branching and frequently produces many heads hence requires frequent pruning. Has long harvesting period.

Collards southern Georgia (sukuma wild) – Drought tolerant variety that withstands high temperatures. It is a shorter variety with large, tender, bluish green leaves that spread widely. Tolerant to Soft and Black Rot. Collard kales

Collard Mfalme FI – A hybrid with short internodes and many leaves per internode hence more yield per unit area. It is tolerant to a wide range of diseases. Have tender Leaves.

Activity

1

Visit a nearby vegetable market place or vegetable farmers preferably of kales. Ask them about the different varieties of vegetables or kales that they grow at their farms. Find out reasons why they chose to grow the mentioned varieties. Note the responses in your note book.

Lesson 2: Growing vegetables, from nursery bed preparation to harvesting

Learning outcome

By the end of the lesson, you should be able to grow Sukuma wiki or a vegetable of your choice from nursery bed preparation to harvesting.

Materials that you will need in this lesson

notebook, pen, seeds of vegetables (*sukuma wiki*), organic manure, CAN, DAP, NPK fertilizers, hoe, spade, trowel, mulching material or dry grass, watering can

Introduction

From **lesson 1** of vegetable growing, you have learnt the factors considered when selecting a vegetable crop to grow. In this lesson, we are going to learn how to grow a vegetable crop appropriately.

The lesson is going to focus on growing of leafy vegetables, and our case study is kale (*sukuma wiki*). However, you should note that most of the practices involved in kale growing do apply even to other classes of vegetables.



The kale (Sukuma wiki) is a member of the cabbage family with a wide ecological adaptability

Kale is very high in beta carotene, vitamin K, vitamin C, lutein, zeaxanthin, and roughage and reasonably rich in iron and calcium. The leaves are widely utilized mainly alone or in mixture with other vegetables, meat and pulses.

Overall kales have the potential to transform African economies and contribute to poverty reduction. In Kenya it is grown by 90% of small holder farmers thus providing employment mostly for women and youth who are involved in their production.

They also provide a positive spill over effect upon a range of other industries like transport and trade.

Prefers well-drained, fertile soil high in organic matter, pH 6.0 to 7.5. Can tolerate slightly alkaline soil. Prefers plentiful and consistent moisture. Can tolerate drought, but quality and flavour of leaves suffer.

As plants mature and lower leaves are harvested, plants begin to look less like a clump and start to resemble small palm trees with a cluster of leaves at the top of a long

They are very much liked by the pests such as Beet armyworm, Cutworms, Flea beetles and the Cabbage aphid among others. Diseases that generally affect them include Black rot (Leaf spot), Anthracnose, Downy mildew etc.

Activity 2

Using the skills and knowledge you attained in primary. You are requested to prepare a nursery bed of sukuma wiki or any other leafy vegetable. Manage it very well and transplant the seedlings at the right time to the seed bed. Ensure carrying out all the necessary field practices in order to acquire high and healthy yields.

Take note of the following;

1. Name of the vegetable grown
2. Variety
3. Date of sowing seeds in the nursery bed
4. Number of days taken for germination to take place (seedlings to sprout out)
5. Date of transplanting
6. Number of days up to the signs of maturity show up

End of S.1 Agriculture





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