Grade 10 Agriculture

CBC NOTES | Terms 1, 2 and 3 - notes for 17 topics

IN EVERY TOPIC

- What you will learn, the key words and key terms explained.
- Clear notes under headings and subheadings, with labelled pictures and step-by-step procedures.
- Comparison tables, and advantages and disadvantages where methods are compared.
- Key points to remember, then structured questions to practise.
- All the answers and a glossary at the back.

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Strand 1.0 Crop Production | Term 1

1.1 Agricultural Land

WHAT YOU WILL LEARN

By the end of this topic you should be able to:

- describe ways of accessing land for agricultural use
- evaluate utility of land for agricultural production purposes
- analyse natural factors that determine productivity of land in agriculture

KEY WORDS

land, tenure, title deed, lease, inheritance, utility, productivity, altitude, topography, agro-ecological zone.

Every bag of maize, litre of milk and kilogram of tea starts on a piece of land. In this topic we learn the ways a farmer can get land, how the same land can be put to different uses, and the natural factors (climate, altitude, topography, soil and living things) that decide how much a piece of land can produce.

1. Land as a factor of production

Land
The surface of the earth not covered by the sea, together with what is on it and under it: soil, water, minerals, vegetation and the climate above it.

Agricultural land
Land that is suitable for, and used for, growing crops, keeping animals, growing trees and other farming activities.

Land is one of the four factors of production, together with labour, capital and entrepreneurship. Without land there is no farming: it carries the crops and animals, holds the water and gives space for farm structures.

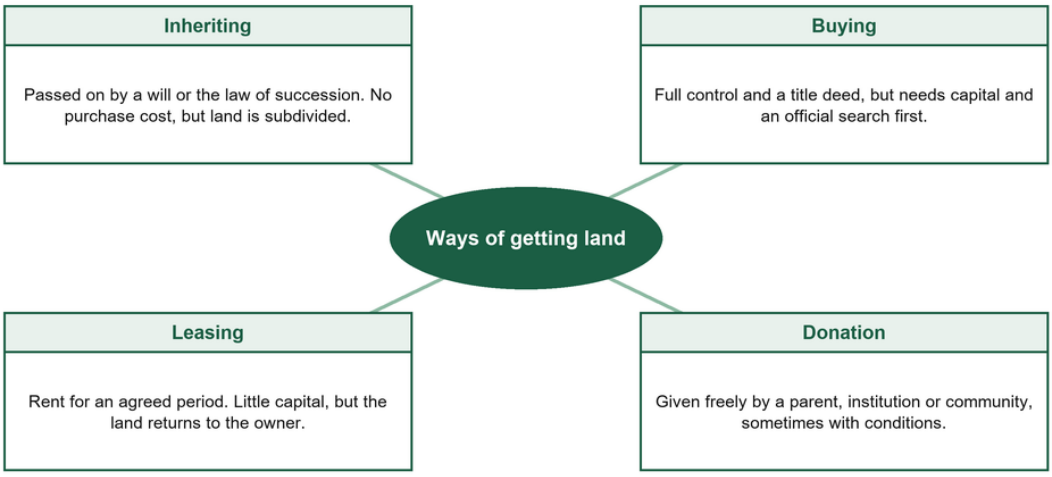
Features of land

- Its supply is fixed: it cannot be increased, although it can be improved (for example by irrigation, drainage or manuring).
- It cannot be moved from place to place.
- It differs from place to place in fertility, slope and climate.
- It has alternative uses: one plot can grow maize, hold cattle or carry a house.
- It is a free gift of nature, so it has no cost of production, but it costs money to own or use.
- It can last for ever if it is looked after well.

REMEMBER
Because land is fixed in supply while the population keeps growing, every piece of farm land must be used wisely and protected from erosion and pollution.

2. Ways of accessing land for agricultural use

A person who wants to farm can get land in several ways. The main ones named in the syllabus are inheriting, buying, leasing and donation.



The four main ways of getting land for farming

Inheritance
Land passed from parents or relatives to their children or other beneficiaries, by a will or by the law of succession when there is no will.

Lease
An agreement in which the owner allows another person to use land for an agreed period in return for rent.

Donation
Land given freely, for example by a parent, an institution or the community.

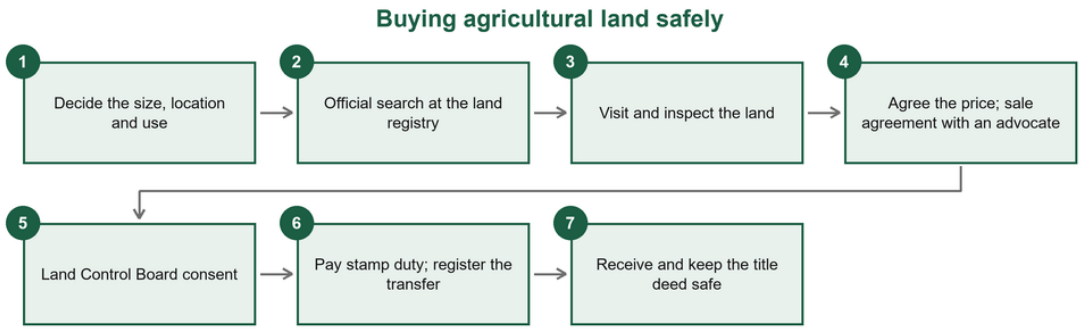
Title deed
The legal document that shows who owns a registered piece of land.

Comparing the ways of getting land

Way	Advantages	Disadvantages
Inheriting	No purchase cost; the land is often known to the family	Land is subdivided into smaller and smaller pieces; family disagreements may arise
Buying	Full control; the owner can develop, sell or use the land as security for a loan	Needs a lot of capital; risk of fraud if the right steps are skipped
Leasing	Little capital needed; can be ended when the agreement expires	Cannot be sold; may be lost at the end of the period; heavy permanent improvements are risky
Donation	Free; helps those without money to start farming	Depends on the goodwill of the giver; may come with conditions

Other ways include allocation by the government in settlement schemes, community land and group ranches, and buying together through a cooperative, chama or land-buying company. In Kenya land is held as private, public or community land, and every dealing must be registered.

Buying land the safe way



Steps in buying agricultural land

WATCH OUT

Many people lose money by paying for land before an official search at the land registry. The search shows the true owner and whether there is a loan, court case or restriction on the land.

The way chosen depends on the money available, how long the farmer wants the land and the enterprise: a tea or coffee farmer needs security for many years, while a vegetable farmer can use a short lease.

3. Uses and utility of land

Utility of land

How useful a piece of land is for a particular purpose. The same land can have a high utility for one use and a low one for another.

Land is put to many uses: crop farming, grazing and livestock keeping, forestry, wildlife conservation and tourism, settlement (homes, schools, shops), industry and mining, and infrastructure such as roads.

Questions a farmer asks before deciding the use

- Is the soil fertile and deep enough?
- Is there reliable rainfall or water for irrigation?
- Is the land flat, gently sloping or steep?
- How far is the market and is there a road?
- What does the law allow? (For example, no cultivation on a river bank.)
- What are the costs and the expected returns of each use?

Two farms, two best uses

Fertile land near Kiambu town with water: vegetables sold daily earn more than maize.
Dry land far from a market in Makueni: goats and drought-tolerant crops suit it better.
The best use may change when conditions change, for example when a new road or irrigation scheme is built.

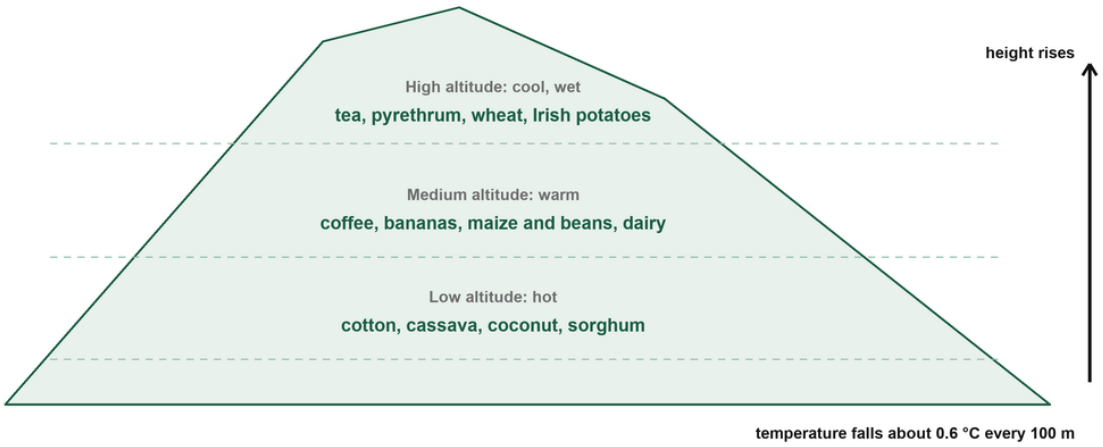
4. Natural factors that determine land productivity

> **Land productivity**
> The amount of produce land gives per unit area in a given time, for example kilograms of maize per hectare per year.

Productivity depends on natural factors (climate, altitude, topography, soil and living things) and on human factors such as management, inputs and technology. The syllabus asks us to analyse the natural ones.

Natural factors and their effects

Factor	How it affects productivity
Rainfall	Amount, timing and reliability decide which crops survive; maize needs about 500 to 1,200 mm of well-spread rain a year, sorghum and millet need less
Temperature	Each crop grows best in a range: tea likes cool, coffee moderate and cotton warm conditions; frost damages many crops
Light and wind	Sunshine drives photosynthesis and flowering; strong wind breaks crops and dries the soil
Humidity	High humidity encourages fungal diseases such as blight
Altitude	Temperature falls by about 0.6 °C for every 100 m rise, so the crops change with height
Topography	Steep slopes lose soil and water and need terraces; valley bottoms may waterlog; flat land is easy to farm and mechanise
Soil	Depth, texture, structure, fertility and pH decide which crops grow well
Biotic factors	Pests, diseases and weeds lower yields; pollinators, earthworms and nitrogen-fixing bacteria raise them



How altitude changes the crops grown in Kenya

Agro-ecological zones

Kenya is divided into agro-ecological zones by altitude, rainfall and temperature. Matching the enterprise to the zone gives higher yields at lower cost.

Zone	Suitable enterprises
Upper highlands (cool, wet)	Tea, pyrethrum, Irish potatoes, dairy cattle
Upper midlands	Coffee, bananas, maize and beans, dairy
Lower midlands	Cotton, sunflower, sorghum, millet, cassava, beef cattle
Hot, dry lowlands	Ranching cattle, goats, sheep and camels; irrigated crops along rivers
Coastal lowlands	Coconut, cashew nuts, mangoes, cassava, sugarcane

THINK ABOUT IT

A farmer cannot change the climate, but can choose suitable crops and varieties, plant at the right time and use irrigation, mulch and windbreaks to reduce its effects.

5. Importance of land in agricultural production

- Food security: land grows the crops and supports the animals that feed the nation.
- Jobs and income: farming employs many Kenyans; tea, coffee, flowers and vegetables earn foreign exchange.
- Raw materials: cotton, sugarcane, pyrethrum and hides feed industries.
- Water and environment: land holds water, carries forests and is home to wildlife.
- Security for loans: a title deed can be used to borrow capital.

Because land is so valuable, every dealing in it should follow the law, and neighbours and other land users should be respected.

KEY POINTS TO REMEMBER

- Land is a fixed, immovable factor of production whose quality differs from place to place.
- Land for farming is got by inheriting, buying, leasing, donation and government allocation.
- Before buying land, do an official search, use a written agreement, get Land Control Board consent and register the transfer.
- The utility of land is its usefulness for a purpose; land is put to the use that suits it and pays best.
- Land productivity depends on climate, altitude, topography, soil and living things.
- Matching enterprises to agro-ecological zones raises yields and lowers costs.

ANSWER THESE

1. State four ways of accessing land for agricultural use. (4 marks)

2. Give two advantages and two disadvantages of leasing land for farming. (4 marks)

3. Explain why an official search should be done before buying land. (2 marks)

4. What is meant by the utility of land? (1 mark)

5. Explain how each of the following affects the productivity of land: (a) altitude (b) topography (c) biotic factors. (6 marks)

6. A farmer in a hot, dry lowland area wants to grow tea. Advise the farmer. (3 marks)

7. State three reasons why land is important in agricultural production. (3 marks)

Strand 1.0 Crop Production | Term 1

1.2 Properties of Soil

WHAT YOU WILL LEARN

By the end of this topic you should be able to:

- describe properties of a soil for crop production
- investigate the properties of soil for crop production
- relate importance of soil profile to crop production
- acknowledge importance of soil properties in crop production

KEY WORDS

texture, structure, porosity, permeability, capillarity, humus, pH, profile, horizon, parent material.

Two farmers plant the same maize variety on the same day; one harvests twice as much as the other. Often the difference is the soil. In this topic we learn the physical, chemical and biological properties of soil, how to test them with simple experiments, and how the soil profile affects crop production.

1. What soil is made of

> **Soil**
> The natural surface layer of the earth in which plants grow, made of mineral matter, organic matter, water, air and living organisms.

Components of soil

Component	Share in a good soil	Role
Mineral matter	about 45%	Broken rock particles (sand, silt, clay) that hold nutrients and anchor roots
Organic matter	about 5%	Rotting plant and animal remains that become humus
Water	about 25%	Dissolves nutrients and is taken up by roots
Air	about 25%	Gives oxygen for root and organism respiration
Living organisms	small but vital	Bacteria, fungi and earthworms break down matter and mix the soil

The shares of water and air change with the weather: after heavy rain water fills most spaces; in a dry spell air fills them.

Soil properties are grouped into three: physical (texture, structure, porosity, drainage, capillarity, water holding capacity), chemical (pH and nutrients) and biological (humus and living organisms).