



BOOKS



ME&S

REPUBLIC OF SOMALILAND

Ministry of Education & Science

GEOGRAPHY

Form Four



 **+252 63 – 4461260 | +252 6365 – 9152953**

 **ardaykaab2018@gmail.com**

*Address: Waxaad ka helayso Arday- kaab Bookshop and Multiservice Center
oo ku yaala ka soo horjeedka Dugsiga sare ee 26june*

Instructors:

1. Mohamed Taharo
2. Mohamoud Kader
3. Mustafe Agro
4. Cumar Caynaan

Contents

CHAPTER1.....	3
AGRICULTURE.....	3
• FACTORSINFLUENCINGAGRICULTURE.....	3
1- Physicalfactors.....	3
2- Biologicalfactors.....	6
3- Humanfactors.....	7
4- Economicfactors.....	8
5- Politicalfactors.....	8
• IMPORTANCEOFAGRICULTURE.....	8
• CLASSIFCATION (TYPES)OFFARMING.....	9
• CROPFARMING.....	15
(a) CEREALS	15
1. MAIZE	15
2. BARLEY	20
3. OATS	22
4. RICE	23
5. MILLET	26
6. BEANS	29
7. SORGHUM	32
8. WHEAT	34
(b) BEVERAGECROPS.....	37
1) SUGARCANE.....	37
2) TEA	42
3) COCOA	44
4) COFFEE	46
(c) OILCROPS	48
1. GROUND NUT.....	48
2. SESAME	49

(d) HORTICULTURALCROPS.....	54
1. MANGO.....	54
3. GUAVA.....	58
4. LEMON.....	59
5. GRAPE.....	60
• ANIMALFARMING.....	63
• Problems facing pastoral communityinSomaliland.....	66
• MAIN TYPESOFFIBER.....	67
• FARM TOOLSAND EQUIPMENTS.....	73
1. Garden toolsandequipment.....	74
2. Livestock production toolsandequipment.....	80
REVIEWQUESTIONS.....	84
✓ Part one: multiplechoicequestions.....	84
• Part two: answer all the questions in thespaceprovided.....	105

CHAPTER 1 AGRICULTURE

➡ **Agriculture** is the practice of cultivating crops and rearing of animals.

- It produces raw materials of **two** basic needs of **food** and **clothing** for people.
- Farming is a system because it consists of **three** components of **input, process** and **output**, or **expenditure, storage** and **income** of the farm.

➡ **FACTORS INFLUENCING AGRICULTURE**

1- **Physical factors**

(a) **Climate**

I. Temperature

- **Temperature affects agriculture in two ways.**

1) low temperature

- Slow growth rate of crops as the process of photosynthesis is slowed.
- High incidence of diseases in some crops such as coffee.

2) High temperature

- Increase evaporation leading to wilting of crops.
- Increase rate of growth or fasten the maturity of crops.

II. **Sunshine:** It provides energy used in photosynthesis.

- **Light duration:** refers to the period during which light is available.
- The duration of light is also called **photoperiod or day length**. This exerts considerable influence on flowering. Based on the response by plants we classify plants:

a) **Long day plants:** Cabbage, Cauliflower, Onion, Beet, Radish, Carrot, Spinach, Potato, Dill and Plantago.

b) **Short day plants:** Strawberry, Pineapple, Poinsettia, Aster, Balsam, Salvia, Euphorbia and Xanthium.

c) **Day neutral plants:** Tomato, most fruit crops, Pepper, Cucumber, Snapdragon, Mirabilis and certain varieties of peas.

- **Light intensity:** strength of the rays of the light energy

➡ **Amount of light harnessed can be increased by:**

- a) Pruning
- b) Thinning
- c) Weeding
- d) Widerspacing

d) **Wind:** refers to the air in motion.

➡ **Effects of wind on crop production**

- Increase the rate of evaporation.
- Strong wind causes destruction of crops.
- Acting as agent of seed dispersal.
- Acting as agent of soil erosion.

e) Rainfall

- ✓ aspects of rainfall
 - rainfall reliability
 - amount of rainfall
 - rainfall distribution
 - rainfall intensity

(b) Soil

- 1) **Soil texture:** is the size of soil particles. Can either be coarse, medium or fine.
- 2) **Soil structure:** is arrangement of soil particles
- 3) **Soil moisture:** It is contained within the pores between the soil particles.
- 4) **Soil air:** It is contained within the pores between the soil particles.
- 5) **Soil temperature:** hotness or coldness of the soil.

(c) Topography(relief)

I. Altitude

- Differences in altitude determine the type of crops that can be grown and animals which can be reared. This is because altitude influence temperature.
- For this reason it is possible to grow **temperate crops** like wheat and apples within the tropical highlands where the climate is similar to that of the temperate lands.

II. Terrain

- Terrains which are referred to configuration, determines drainage. Most crops do well on land that has a slope since the soils there are well drained.
- Tea and coffee are grown in the Kenya highlands where there are hills and slopes which facilitate proper soil drainage.
- Wet paddy is grown in waterlogged soils in Asia.
- The livestock rearing is also favored by gentle terrain as the animals can graze with ease on the gentle slopes.
- Relatively level surface are suitable for growing fodder crops.
- For this reason, many plateaus and lowlands are densely populated by agricultural communities.

III. Aspect

- Slopes that are exposed to the sun are warmer and they can therefore support crop-growing and livestock rearing.
- The slopes which face away from the sun tend to be cooler and lack direct sunshine.
- Such slopes are dominated by grassland and forest.
- Windward slopes are normally wetter than the leeward. They are therefore more suitable for crop growing.
- Grazing takes place on the lower slopes because they are covered by grass while the higher slopes are covered by forests due to more rainfall.

2- Biological factors

(a) Weeds

➔ Benefits of weeds

1. Weeds bind soil particles thus reducing soil erosion.
2. Most grass weeds are used as livestock feed.
3. Weed residue can be used as mulch.
4. Weeds decay and add organic matter to the soil.
5. Leguminous weeds fix nitrogen in the soil.

➔ Harmful effects of weeds

1. Weeds reduce the quality of farm produce
2. They compete for nutrients, water, space and light.
3. Some weeds are poisonous and can poison livestock and human.
4. Some cause irritation to farm workers.
5. They increase cost of production since they have to be controlled.
6. Weeds harbor pests and diseases.

(b) Pests

➔ Effects of pests on crop production

- Chewing of leaves thus reducing the photosynthetic area.
- They transmit diseases.
- They increase cost of production.

(c) Diseases

- Reduce quality of crop products.
- Increase cost of production.
- Can kill livestock.

(d) Decomposers

- Increase soil fertility by decomposing organic matter.



(e) Pollinators

- Responsible for cross-pollination.
-

3- Human factors

(a) Social factors

I. Cultural traditions

- Traditions can influence the kind of crops grown or the animal kept.
- Some community may concentrate on growing **finger millet** because it is their staple food while others grow **maize** because it is their staple food.
- Most of the lowland south-east Asia is used for growing **rice** which is the staple food in the region.
- The animals kept by a community are also dependent on traditional practices in most cases.
- For example, the **maasai** of **Kenya** value **cattle** so much in high esteem.
- The **turkana** keep **donkeys** because traditionally these animals were used as a means of transportation.
- Livestock species are a source of protein for **Timor-Leste** population. **Meat dog** is consumed either at home or in the traditional restaurants, though in Viqueque only by men, being assumed that for women it is considered sacred (Miranda, 2011).

II. Religious beliefs

- Commercial **cattle-rearing** cannot be practiced among the **Hindu** because they treat the cow as a sacred animal.
- **Pig-rearing** would equally be difficult in a region where there is a large presence of **Muslims** because their holy Koran forbids it.

III. Land tenure system

- Large-scale farming may not be possible where a land owner is required by tradition to subdivide the land among the children or where the land is subdivided into smaller plots during inheritance. Where the land is communally owned, e.g.

where pastoralism is practiced, one is not free to grow or keep whatever he or she likes.

4- Economic factors

- I. Operational cost.
- II. Marketing expenses.
 - ✓ Cost of Storage
 - ✓ Cost of transportation
- III. Price fluctuations

5- Political factors

➡ Government policies that affects agriculture positively include

1. Formulation of laws that help to conserve soil and water-catchment areas.
2. Formulation of policies that create markets for agricultural produce within and outside the country.
3. Formulation of policies that control importation of agricultural produce and inputs.
4. Reduction of taxes on agricultural inputs.
5. Imposition on quality control on agricultural produce.

➡ Government policies that affects agriculture negatively include

1. Poor pricing policies and price control.
2. Imposition of high taxes on agricultural inputs.
3. Failure to protect agriculture from negative effects.

➡ IMPORTANCE OF AGRICULTURE

1. Source of food
2. Source of raw materials
3. Source of income
4. Source of medicine and herbal materials
5. Source of foreign exchange
6. Provides employment

➡ **CLASSIFICATION (TYPES) OF FARMING**

- 1- Classification based on specialization
- 2- Classification based on the location
- 3- Classification based on the output
- 4- Classification based on the input

A) Classification based on specialization

1. Arable farming
2. Livestock farming
3. Mixed farming

1- Arable farming

- ✓ Arable farming involves the cultivation and management of crops.

➡ **Types of arable farming.**

- (a) Subsistence arable farming
- (b) Commercial arable farming

(a) Types of Subsistence arable farming

- I. Shifting cultivation
- II. Sedentary subsistence farming
- III. Intensive subsistence farming



B) Classification based on the location

1. Shifting cultivation
2. Sedentary subsistence farming

➡ Shifting cultivation (Simple subsistence farming).

- ✓ Is the practice of cultivating a piece of land until the soil is exhausted after which the farmer moves to more fertile soil.
- ✓ It is also called **slash** and **burn** agriculture
- ✓ Shifting cultivation is known by different names in different parts of the world.
- ✓ In **Zambia** it is known as *citemene*, in **Zimbabwe** as *milpa*, *masole* in the **DRC**, *roca* in **Brazil**, *ladang* in **Malaysia** and *tuangya* in **Burma**.

➡ Shifting cultivation can be practiced where

- Land is abundant
- Livestock per unit area is low
- Population is sparse
- Land is communally owned.

Advantages of shifting cultivation	Disadvantages of shifting cultivation
• Land is allowed to rest and regain its fertility. • It controls the build-up of crop pests and diseases. • Crops benefit from readily available nutrients. • Land is useful after vegetation recover.	• Poor land development. • Burning of land during land clearing leads to loss of nutrients.

➡ **Sedentary subsistence farming**

- In this system the farmer permanently stays in one place but the field is left fallow after their productivity declines and frequently reused.

➡ **Characteristics of Sedentary subsistence farming**

- Crop rotation is practiced.
- More attention is given to the land and the crop grown.
- More labour is used in the fields.
- Animals are used for ploughing.

➡ **Intensive subsistence farming**

- This system involves maximum utilization of all cultivable land.

➡ **Characteristics of intensive subsistence farming**

- It is common among high population areas
- Small plots are cultivated.
- A lot of labour is required.
- Animals are used for ploughing.
- Animal manure is used for fertilizing the land

C) **Classification based on the output**

1. Subsistence farming
2. Commercial farming

➡ **Subsistence farming:** cultivation of crops or rearing of livestock for family consumption.

➡ **Characteristics of subsistence farming**

- Small size of farm
- Low standard living of farmers
- There is no more surplus to sell or to store

- Use of intercropping
- Use of simple tools

➡ **Commercial arable farming**

- This is the growing of **food** and **non-food** crops for sale.

➡ **Characteristics of commercial farms**

- Use of modern farming techniques
- Use of highly mechanized farm machinery
- Farm workers are usually hired
- Use of fertilizers and pesticides to improve yield
- Use of high input of money

➡ **Types of commercial arable farming**

1. Plantation farming
2. Extensive mechanized grain cultivation
3. Intensive commercial agriculture

➡ **Plantation farming**

- It involves the production of one major crop, for example tea or coffee, on a large area of land for commercial purposes.
- It is also called estate farming.

➡ **Characteristics of plantation farming**

- Land size involved is more than **40 hectares**.
- Planted crops are scientifically maintained.
- Expert management is involved for maximum efficiency.
- It is a monoculture

Advantages of plantation farming	Disadvantages of plantation farming
• Constant supply of products. • Provides employment. • Generates foreign exchange. • Mechanization can be used. • High yield of production. • Used for commercial purposes.	• Requires a large area of land. • Large sum of money is required. • Requires skilled labour. • In case of disease and pest outbreak, massive losses can be incurred.

➡ Problems of plantation farming

1. Climatic hazards
2. Insect pests and diseases
3. The dense of vegetation (weed)
4. Rapid decline of soil
5. Monoculture
6. Poor management

➡ Extensive mechanized grain cultivation.

- ✓ This involves growing of grains in large area of land.
- ✓ Large-scale grain cultivation is also **monoculture** farming practice.

➡ Intensive commercial agriculture

- ✓ This type of farming is similar to intensive subsistence farming **except** that its sole purpose is to produce crops for sale.
- ✓ This type of farming is common on the slopes of mountains of Kenya and Kilimanjaro.
- ✓ It is well developed in north-western Europe, eastern USA and some parts of the former USSR.

➡ Characteristics of intensive commercial agriculture

1. Mohamed-Taharo
2. Mohamoudkader
3. Mustafe – Agro
4. Cumar caynaan

- Small area of land
 - Manual labour is used.
 - Use large amount of fertilizers
 - Maximum yield per unit area.
-

D) Classification based on the input

1. Intensive farming
2. Extensive farming

➡ **Intensive farming:** uses a small-sized farm with a high input to produce a high yield per unit area.

➡ Horticulture farms, dairy farms and market gardening farms in **HICs** and the rice growing in **LICs** are good examples.

- Locates near urban areas for easy access to markets.
- They give high return or yield per hectare.
- The land is cultivated annually and is not left fallow.
- They are mainly commercial farming **except** the rice growing in **south-east Asia**.
- Uses high capital, labor, fertilizer and machinery, e.g., greenhouse farms.

➡ **Extensive farming:** uses small amount of input and relatively large areas of land from which lower yields are obtained per unit area.

➡ the vast mechanized wheat farm in **HICs**, the nomadic herding in **LICs**, mechanized sorghum and wheat farming in **Wajale**, Somaliland.

- They give low yield per hectare of land.
- It relates to pastoralism and cereal cultivation of dry-farming in semi-arid areas.

➡ CROP FARMING

- Crop or arable farming is the cultivation and production of crop only on cultivated piece of land.

➡ Terminology in crop production

1. **Sole crop:** One crop variety grown alone in a pure stand in a single season
2. **Monocrop:** The repetitive growing of the same sole crop on the same piece of land
3. **Intercrop:** Growing two or more species simultaneously in the same field for at least part of the life of each species.
4. **Mixed cropping:** it is the growing of different crops in the same field at the same time but in different sections.

➡ Based on their lifecycle crops can be:

- **Annual crops:** plants which take one season to complete their lifecycle.
- **Perennial crops:** plants that grow continually for many years.
- **Biennials:** crops having a life cycle that lasts **two** seasons.

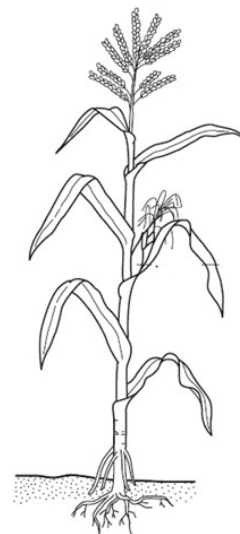
(a) CEREALS

- Maize, wheat and rice are the three principal grain crops of the world.
- They produce edible seeds which form an important part of the daily diet of the world's population.

1. MAIZE

- Maize, which is also known as corn, is a cereal which grows to a height of about **1.5m**.

1. Mohamed-Taharo
2. Mohamoudkader
3. Mustafe – Agro
4. Cumar caynaan



- **Scientific name:** ZeaMays
- **Family:** grass family, poaceae orgramineae.

➡ Growing conditions ofmaize

- A growing season between 3 to 6 months or 150 and 210days.
- **Altitude** of **2200 m** above sealevel.
- Daily temperatures between **20°C to 25°C** and night temperature should not fall down 15°C.
- An annual rainfall of **620 mm to1000mm**.
- Well-drained fertile alluvial or loam soil, rich in**NPK**.
- It cannot withstand**water-logging**.
- Prefers soils with neutral pH oralkaline.
- A dry, sunny season to enable the cobs to ripen.

➡ The main maize-growing areas

- Most of the world's maize is grown in the warm temperate latitudes, especially in the eastern states of the U.S.A. and in easternArgentina.
- Most of the maize grown in these two countries is fed to the animals whereas most of that grown in other parts of South America, and in Africa and Asia is grown as a food forpeople.

➡ The corn belt of theU.S.A

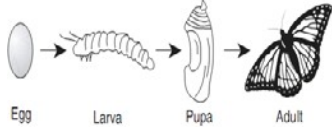
- U.S.A is the greatest producer ofmaize.
- The principle maize region of the U.S.A. occupies large areas of the states of Nebraska, Missouri, Indiana, Illinois, Iowa andOhio.
- This region is known as the ***cornbelt***.

➡ Argentina

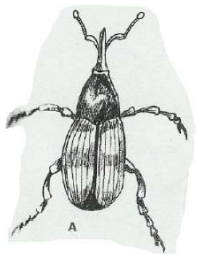
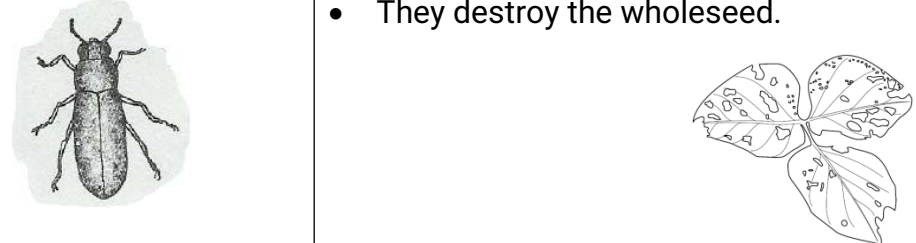
- The eastern part of the pampas in Argentina is an important producer of maize and the amount of maize exported annually by Argentina makes her the second most important maize exporter. Most of the maize is exported to countries of North-Western Europe where it is used as an animal feed.

➡ PESTS AND DISEASES OF MAIZE AND THEIR CONTROL

A. Field pests

pest	Description of pest and effects of attack	Control measures
Stalk borer 	- They attack sorghum, sugar cane, rice and maize. - They make holes on leaves. - They bore into cobs and stem.	- Crop rotation. - Use of insecticides. - Rogueing. - Early planting. - Closed season.
Army worm 	- They are the larval stage of moths. - They have biting and chewing mouth. - They feed on crop leaves. - They defoliate plants completely.	- Use of predators such as wasps and beetles. - Use of insecticides.
Aphids 	- They suck plant sap, hence retarding plant growth. - They transmit mosaic viral disease. - They attack crops both in the nursery and in the field.	- Use of insecticides. - Irrigating crops in the dry seasons. - Closed season. - Early planting.
weaver bird 	- They eat grains. - They cause grains to fall off. - They expose grains to rain, making them to rot. - Some birds eat fruits.	- Trapping - Poisoning. - Scaring away. - Destroying their breeding sites.

B. Storage pests

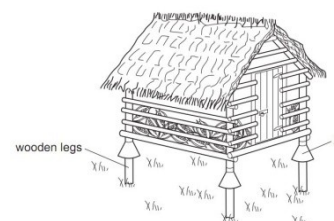
pest	Description of pest and effects of attack	Control measures
Maize weevil. 	• They attack crops in the field and in the store. • They make circular holes on the surface of grains. • Their larvae bore grains and consume the endosperm.	• Use of insecticides. • Clean and dust the store. • Avoid mixing infected maize with clean maize.
Beetles. 	• They make holes on leaves. • They destroy the whole seed.	• Use of insecticides. • Proper field and storage hygiene.

Rodents.

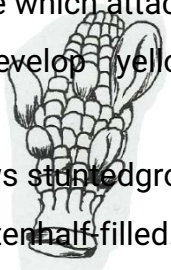


- They include **squirrels, moles** and **rats**.
- **Squirrel** unearths and eats sown seeds.
- **Moles** eat and destroy crop root and tubers.
- **Squirrel** climb maize stalks to eat grains.
- **Rats** eat and **contaminate** grains with their excreta.
- **Rats** make **holes** in sacks and storage basket.

- Poisoning.
- Use of predators.
- Trapping and killing.
- Use of rat proof stores.



C. Diseases of maize

disease	Description and signs of attack	Control measure.
Leaf blight.	• It is fungal disease that affects leaves. • It is characterized by oval, grey and dry lesions on the leaves.	• Rogueing. • Use of resistant variety. • Crop rotation.
Maize streak	• It is viral disease which attacks leaves. • The leaves develop yellow stripes along the veins. • The maize shows stunted growth. • The cobs are often half-filled. • It is spread by leafhoppers. 	• Early planting. • Crop rotation. • Field hygiene. • Control of vectors. • Use of resistant variety. • Rogueing. • Use of certified seeds. • Closed season.

Rust	• This is a fungal disease of coffee and cereals. • It forms brown spots or orange swellings on leaves. • It causes premature leaf fall or defoliation.	• Rotating with legumes. • Use of resistant variety. • Use of fungicides. • Proper pruning. • Use of certified seeds.
Head smut 	• This is fungal disease. • It attacks maize, wheat, barley and sugar cane.	• Crop rotation. • Field hygiene. • Use of certified seeds. • Hot-water treatment.

2. BARLEY

- **Barley** (*Hordeum vulgare*), a member of the **grass family**, is a major **cereal grain** grown in **temperate climates** globally. It was one of the first cultivated grains, particularly in **Eurasia** as early as 10,000 years ago. Barley has been used as animal **fodder**, as a source of fermentable material for **beer** and certain **distilled beverages**, and as a component of various **health foods**. It is used in soups and stews, and in barley bread of various cultures. Barley grains are commonly made into **malt** in a traditional and ancient method of preparation.
- In 2017, barley was ranked fourth among grains in quantity produced (149 million tonnes) behind **maize, rice** and **wheat**.

➡ Origin

- **First domesticated grains** in the **Fertile Crescent**, an area of relatively abundant water in Western Asia, and near the **Nile** River of northeast Africa.

➡ **Agronomic requirements**

➡ ***Climatic requirements***

- It requires a shorter growing period and needs an average temperature of **15 to 17 °C** during flowering. The annual temperatures required range from 5 to 27 °C (low temperatures and high temperatures during ripening). It tolerates high temperatures.

➡ **Rainfall**

- Barley is a drought resistant crop and requires **390 to 430 mm** of rainfall for optimum yield. Maximum water use will occur for 21 to 28 days.

➡ **Soil requirements**

- Barley can be grown on a wide range of soil types; ranging from **heavy clays to light or sandy loam soils**. It grows well on fertile, deep loam soils with a **pH of 6 to 7.5**. Soils with a pH lower than 6 may induce aluminium toxicity, leading to poor growth. Barley is more sensitive to very wet conditions but more tolerant to alkaline soil than the other small grains.

➡ **The main barley regions**

- The **largest barley producers** are the **U.S.A., the C.I.S., Canada, Australia, China and India**.
- It is grown in particularly all countries of Europe, especially in Mediterranean countries where it has been cultivated for several thousand years.
- In addition, it is a subsistence crop of the tropics of Bolivia, Tibet and Peru.

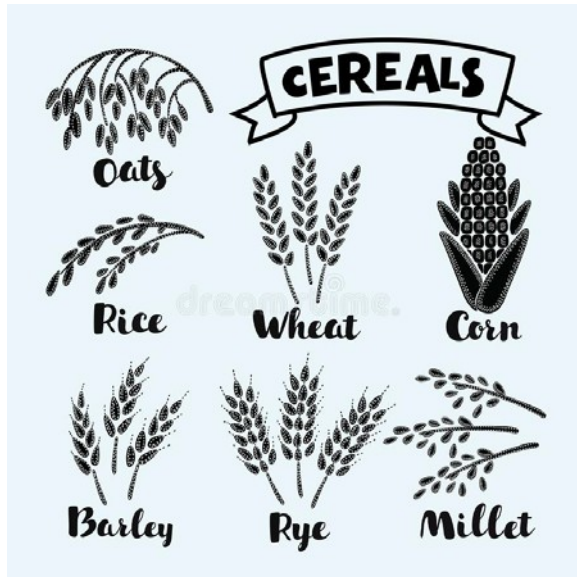
➡ **International trade of barley**

- Much of the world's barley is used for local consumption and as feed for animals raised in the areas of barley production.
- However, Western Europe is a significant importer of barley as a feed for dairy cattle and for making malt



which is used in the making of beer.

- Good quality barley, packed in tins, is also exported to countries throughout the world for human consumption.



3. OATS

- The **oat** (*Avena sativa*), sometimes called the **common oat**, is a species of cereal grain grown for its seed. While oats are suitable for human consumption as **oatmeal** and **rolled oats**, one of the most common uses is as **livestock feed**. Oats are a **nutrient-rich** food associated with lower blood **cholesterol** when consumed regularly.
- Like barley, oats are a very hardy cereal and are also used extensively as food for human beings as well as feed for poultry and animals, particularly cattle.
- Even the straw makes good fodder for cattle.



➡ Growing conditions

1. Mohamed-Taharo
2. Mohamoudkader
3. Mustafe –Agro
4. Cumar caynaan

- Oats prefer a cool damp climate, but they cannot withstand cold as well as wheat and barley.
- Quality of soil is not as important as it is for wheat or barley.
- Oats thrive best in the humid regions of the cool temperate belt.
- However, they **do not** grow well in areas which have temperatures above **15 °C**, and are therefore not grown extensively in tropical and sub-tropical lowland regions.

➡ The main oats regions

- Important **oats producing regions** are the northern parts of the U.S.A., southern Canada, north-western Europe (particularly Britain and Scandinavia), Poland and the central and eastern of the C.I.S.
- Minor production regions are in northern Japan and Argentina.

4. RICE

- Rice is the seeds of a grass family plant botanically called **Oryza sativa**.
- **Scientific name:** Oryza sativa
- **Family:** grass family, poaceae or gramineae.
- Wild rice called **Zizania species**, from which the crop was developed, may have its native range in **Australia**.
- Rice is the **third-highest** worldwide production in agricultural commodity after **sugarcane** and **maize**.
- Between one-third and one half of the world's population eats rice.
- Rice grows very well in the warm, wet monsoon regions of tropical Asia, in some sub-tropical regions such as Lower Egypt and southern California which have an abundance of irrigation water.

➡ Types of rice cultivation

- There are **two types** of **rice** cultivation; the 'dry' system in which rice grown on dry land, and the 'wet' system in which it is grown on land that is flooded from planting time to harvesting time.
- However, rice grown under the 'dry' system needs about 1200 mm (50 in) of rain a year.

➡ Growing conditions of rice

- Altitude: **0 to 3000 m** above sea level
- Temperature: **21°C to 37°C** followed dry sunny period in which the crop ripens.
- Annual rainfall: over 2000 (about 80 in) with at least 120 mm (5 in) falling in each month of the growing season.
- Rainfall: rice is **semi-aquatic** crop and grows best in submerged conditions.
- Flat land to allow the soil to retain the water.
- Soil: **clay** or **clay-loam** soils
- Soil pH: **5.5 to 6.5**

➡ The cultivation of the rice

- The rice fields are carefully leveled and earth walls, called **bunds** are built just before the wet monsoon begins, because rice requires abundant water during the growing season.
- The seeds are either sown directly in the field or in nursery where they are allowed to germinate and grow into young seedlings which are then transplanted into the flooded field.
- Rice reach maturity after about **6 months** with a small wind-pollinated flowers and then fields are drained to allow the seeds to ripen, after which is harvested.

➡ The harvesting and processing of rice

- Rice is harvested **by hand** in **Asia** because the small rice fields make the use of machines uneconomic, but machines are used where rice fields form large units, such as in the **U.S.A**, and **Australia**.
- After it is harvested, the seeds are separated from the stalk by **threshing** and later **dehusked** and polished in the rice mills. Also, in rural areas the seeds are dehusked by pounding in a large wooden tub and then winnowed by tossing seeds in a bambootray.

➡ **Consumption of rice**

- Rice is the staple food over half of the world's population.
- It is the predominant dietary energy source for 17 countries in Asia and the Pacific, 9 countries in the North and South America and 8 countries in Africa.
- Rice provides 20% of the world's dietary energy supply, while wheat supplies 19% and maize 5%.

➡ **The nutrient content of rice varies based on a number of factors**

- It depends on the variety of rice that is between white, brown, red and black of rice
 - It depends the nutrient quality of the soil rice is grown.
 - It depends on how the rice is processed.
 - It depends on the manner it is enriched.
-

➡ Rice production and world trade

- Over 80% of the world's supply of rice comes from Asia.
- Because rice is the staple food of a large part of the population of Asia, most of the demand for, and the supply of, rice comes mainly from the Asian countries.
- The **three largest exporters** of rice are the **U.S.A., Burma and Thailand**, and most of the rice these countries export is imported by Indonesia, India, Japan and Malaysia.
 1. The Si-Kiang and Yangtze basin of China.
 2. The Ganges delta of India and Bangladesh.
 3. The Red River of delta of North Vietnam.
 4. The Irrawaddy delta of Burma
 5. The Chao Phraya delta of Thailand.
 6. The Mekong delta of Cambodia.
 7. The alluvial coastal plains of Japan and Indonesia.
 8. The Mississippi delta and parts of Southern California, U.S.A.
 9. The Po basin in Northern Italy.
 10. The Nile delta of Egypt
 11. Parts of New South Wales of Australia.

➡ Pests of rice

- Rice pests include **weeds, pathogens, insects, nematodes, rodents and birds**. A variety of factors contribute to pest outbreaks, including climatic factors, improper irrigation, the overuse of insecticides and high rates of nitrogen fertilizer application.

➡ Diseases of rice

- **Rice blast** caused by the fungus *magnaporthe grisea* is the most significant disease affecting rice cultivation. Other major diseases include **sheath blight** (*rhizoctonia solani*) and tungro.

5. MILLET

- Millet is originated in the savannah areas of West Africa from where it is spread to the rest of the African continent and then to India.
- It is the staple food of in drier areas of Africa and India.
- Millets are essentially a subsistence crop and they hardly enter into international trade. Several variety of millets are grown, and these are adapted to different climatic conditions, although in general, they tolerate poor soils

➡ The main millet regions

- The chief millet **regions** are in Asia especially in the north-west Deccan of northern India, Pakistan, the Hwang-ho basin and the Outer provinces of China, Manchuria, the Dry Zone of Burma, the interior basins of central Asia and the upland farming regions of Japan.
- ✓ **Millets are also cultivated extensively by the indigenous subsistence farmers of Africa.**

(a) Bulrush millet

- Bulrush millet is a tall grass up to 3.5 m with a dense, cylindrical spike.

(b) Finger millet.

- Finger millet is a small cereal with very good storage properties.
- The head is split into finger-like structure.

➡ Growing conditions of millet

- ✓ Altitude: **0-2400 m** above sea level.
- ✓ Rainfall: **500-800mm**.
- ✓ Temperature: **20°C -25°C**.
- Too much rain is harmful to millets.
- ✓ Fertile, well-drained soil.

➡ Land preparation

- Due to small size of the seeds, a fine seed bed is required.

➡ Field operation

✓ Planting:

- Planting is done before the onset of the rain.
- Broadcast method is commonly used.

✓ Weeding

- **Mechanical** weed control after the crop is established is **difficult** due to close spacing of the crop.
- Therefore, **hand weeding**, pulling up the weeds, is done because a jembe cannot be used.

➡ Fertilizer application

- Crop should be top-dressed with sulphate of ammonia at the rate of **125 to 250 kg** per hectare when **15-30 cm** high.

✓ Pests and disease control

A. Pests

- **Birds:** weaver bird is the main field pest.

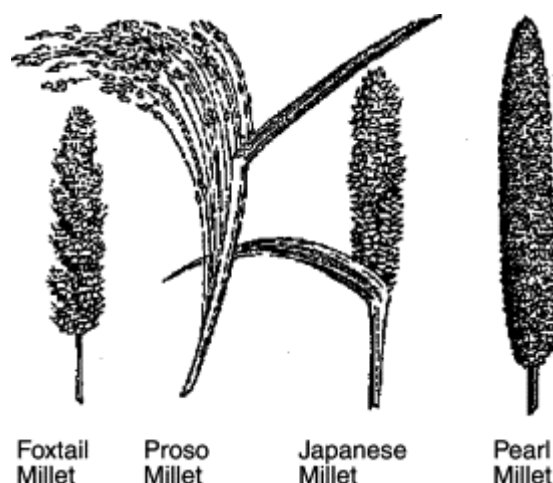
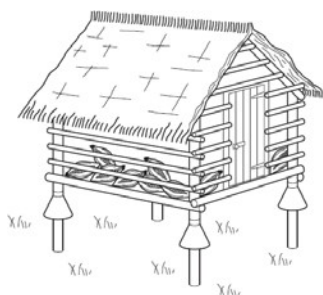


B. Diseases

disease	Description and signs of attack	Control measure.
Downy mildew	- It is a fungal disease - It is characterized by fungal growth on the underside of leaves. - Later, brown to black spots appear on the underside of leaves.	- Use of fungicides. - Crop rotation.
Ergot	- This is a fungal disease. - The affected heads become sticky.	- Use of certified seeds. - Crop rotation. - Rogueing.
Head blast	- This is a fungal disease. - It forms brown lesions with green centres or dead areas on the leaves, neck or the panicle. - It causes panicle sterility or empty panicle.	- Use of resistant variety. - Optimum use of fertilizers. - Crop rotation. - Use of fungicides.

➡ Harvesting and storage

- The head is cut using knife or **sickle**, when dry.
- The heads are **threshed** by beating them on sticks.
- Grains are **winnowed** and dried.
- The grains are then stored in bags.



6. BEANS

➡ Growing conditions of beans

- Altitude: **1000-2000m** above sealevel.
- Rainfall: **625mm**
- Temperature: **25°C**.
- Well-drained, **loamy** soil rich in organicmatter.



➡ Landpreparation

- Beans do not need a fine seedbed as they have largeseeds.
- One primary cultivation and one secondary cultivation will beenough.

➡ Fieldoperation

✓ Planting

- Beans should be planted at the onset of rain **except** during the long rains as the crop may rot. Planting is done on shallowfurrows.
- **Spacing** is **30 cm × 15cm**.
- **Seed rate**: 50 kg perhectare.

➡ Weeding:

- Hand weeding is the commonpractice.
- It should be done **before** flowering to avoid knocking down offlowers.

➡ PESTS AND DISEASECONTROL

A. Pests ofbeans

pests	example	control
• U = American bollworm • V = Beanweevil • W = Beanbruchid • X = Bean aphids.	The image shows four illustrations of pests. At the top is a caterpillar labeled 'U'. Below it are three beetles labeled 'W', 'X', and 'V' from left to right.	1. Use ofinsecticides 2. Earlyplanting. 3. Rogueing

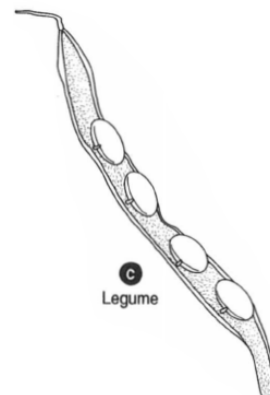
B. Diseases of beans

disease	Description and signs of attack	Control measure
Anthracnose	• This is a fungal disease of coffee and beans. • It forms sunken brown spots with black edges on berries and pods. • It also forms a black mass on the underside of the leaves.	• Use of resistant variety. • Crop rotation. • Rogueing. • Use of clean seeds. • Use of fungicides.
mosaic	• It is viral disease of cassava, tobacco and beans. • It is characterized by curling and yellowing of leaves. • Affected crops show stunted and reduces yields.	• Use of resistant variety. • Crop rotation. • Rogueing. • Hot-water treatment of cuttings. • Controlling whitefly.
Halo blight	• It is a bacterial disease of beans. • It is characterized by formation of irregular dark spots on leaves and pods which are surrounded by a yellow band called halo. • Affected leaves dry along the margins and eventually fall off.	• Use of clean seeds. • Crop rotation. • Rogueing.
Angular-leaf spot.	• This is a fungal disease. • It forms brownish irregular lesions on the upper surface of leaves. • Each lesion is black and hairy on the underside of the leaf.	• Use of fungicides. • Use of clean seeds. • Crop rotation. • Rogueing • Use of resistant variety.

➡ Harvesting

i. The dry seedbeans

- The whole plant is **uprooted**. This is done in the morning to minimize shattering.
- Uprooted plants are gathered on sacks to allow them to dry further.
- When the plants are dry, they are threshed by beating with sticks.
- The trash is then removed before winnowing.



ii. The green bean (French bean)

- This starts about **2 months** after planting.
- Picking is done during the dry weather.
- The **Pods** are packed immediately after picking to avoid loss of condition.



© Can Stock Photo - csp8801606

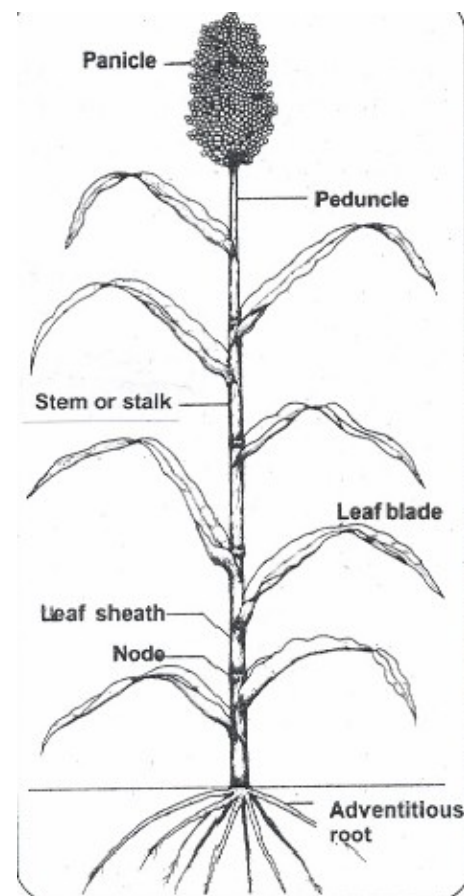
7. SORGHUM

- **Scientific name:** Sorghumvulgare.
- **Family:** poaceae or gramineae

➡ Sorghum is **drought resistant** cereal crop which reaches **1m** to **4m** high and resemble maize before the grains are produced.

➡ Why sorghum is droughtresistant?

- Sorghum is able to tolerate drought better than most other grain crops and can be attributed to:
 1. An exceptionally well developed and finely branched root system, which is very efficient in the absorption of water;
 2. It has a small leaf area per plant, which limits transpiration;
 3. The leaves fold up more efficiently during warm, dry conditions than that of maize;
 4. It has an effective transpiration ratio of 1:310, as the plant uses only 310 parts of water to produce one part of dry matter, compared to a ratio of 1:400 for maize;
 5. The epidermis of the leaf is corky and covered with a waxy layer, which protects the plant from desiccation;
 6. The stomata close rapidly to limit water loss;
 7. During dry periods, sorghum has the ability to remain in a virtually dormant stage and resume growth as soon as conditions become favourable. Even though the main stem can die, side shoots can develop and form seed when the water supply improves.



➡ Growing conditions of sorghum

- Rainfall: **420 mm to 630mm**.
- Altitude: **900 to 1500 m** above sealevel.
- Temperature: **30°C**.
- Fertile, well-drained soil.
- PH: **5 to 8.5**

➡ Field operations

✓ Planting:

- Planting is done by broadcasting.

✓ Fertilizer application

- It responds well to **farm-yard manure** on moist soils.
- **Top-dress** with nitrogenous fertilizer from **2 to 3** weeks after planting.



➡ Pest and disease control

Pest	Diseases
1. Weaver bird also called Sudan dioch (quelea quelea).	1. Leaf blight
2. Sorghum shootfly.	2. Anthracnose.
3. Stem borer	3. Head smut.

➡ Harvesting and storage

- Sorghum is harvested after **3 to 4** months of growth.
- Heads are cut off using a knife and sundried.
- The dry heads are **threshed, winnowed** and stored.

8. WHEAT

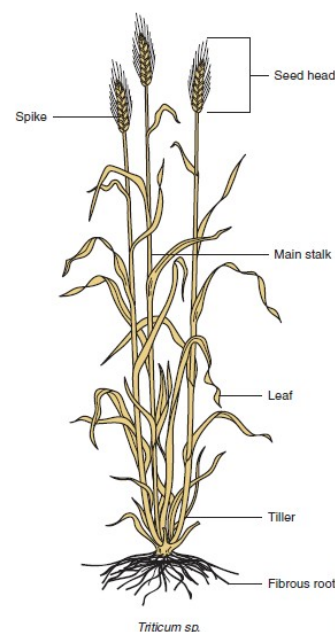
- **Scientific name:** *Triticumaestivum*
- **Family:** poaceae or gramineae
- Wheat is a cereal grain, botanically known as a **Caryopsis** originally the **Levant region** of the Near East, although some archaeological records suggested that this first occurred in the regions known as **the fertile crescent**, (between the two rivers of Euphrates andTigris).
- Wheat is the third most-produced cereal after maize andrice.
- The **emmer** and **einkorn** wheat seeds are the most commonspecies.
- Although wheat is the staple food of most of the people in temperate latitudes, it forms an important part of the diet of the people of northern India and Pakistan, and it is becoming an increasingly important food for many peoples in other parts of Asia.

➡ Growing conditions ofwheat

- Moderate rainfall: **500 mm to1270mm**.
- Temperature: **15°C to 20°C**. Warm condition facilitates maturity ofwheat.
- Warm, dry, sunny season for ripening andharvesting.
- Fertile soil.
- **Flat land:** fairly level land allows proper drainage and mechanized cultivation.

➡ Wheatcultivation

- Wheat is cultivated as cash crop because it produces a good yield per unitarea.
- Grows well in temperate climate between the latitudes of **30°N and 40°N**, and **25°S and 45°S** and yields versatile, high quality flour that is widely used in baking.
- The popularity of foods made from the wheat flour creates a large demand for the grain, even in economics with significant foodsurplus.



► Types of wheat based on the cultivation season

1. ***Spring wheat:*** planted in spring and harvested in the following summer in regions which have severe winters, such as the U.S.A, Canada, C.I.S, and Eastern Europe and in the Northern China.
2. ***Winter spring:*** planted in winter and harvested in the following summer in regions which have mild winters, Australia, Argentina, Central Chile and North-Western Europe.
 - In India and Pakistan, wheat is sown just after the summer monsoon rains begin and it is harvested before the hot wet season begins.
 - Wheat is cultivated extensively as a **monoculture**; on very large farms with the maximum use of heavy machinery, although the yield per unit area is relatively low in the growing regions of U.S.A, Canada, Australia, Argentina, C.I.S and China.
 - Intensive wheat cultivation involves the use of labor rather than machinery on small areas of land which produces a high yield per unit area, and usually it is grown in rotation with other crops to produce wheat crop once every 3 or 4 years. Intensive wheat farming exists in India, Pakistan, China and in European countries.

► Wheat consumption

- Wheat is a major diet component because of its agronomic adaptability with the ability to grow from near arctic regions to equator, from sea level to plains. In addition to agronomic adaptability, wheat offers ease of grain storage and ease of converting grain into flour for making edible, palatable, interesting and satisfying foods such as pasta, bread and biscuits. Wheat is the most important source of carbohydrate in a majority of countries.

➡ Wheatdisease

a) In temperateclimate

- Eyespot, Glume spot, Yellow or Stripe rust, Powdery mildew, Leaf blotch, Brown or Leaf rust, Head blight Tan spot and Stemrust.

b) In tropicalareas

- Spot blotch (also known as leaf blight) is the mostcommon.

➡ Wheat growingregions

- The largest exporters of wheat in 2009 were, in order of exported quantities: U.S.A, EU countries, Canada, Russian Federation, Australia, Ukraine andKazakhstan.
- **Largest importer** of wheat in the world is Italy and turn wheat into flour thenpasta.
- The largest **three producers** are U.S.A, Canada and theC.I.S.

➡ Wheat production and worldtrade

- The **C.I.S.** is the **largest grower** of wheat, producing more than 25% of the world's total annualproduction.
- However, the C.I.S. is not self-sufficient in wheat every year which means that in some years it has to import wheat from other countries, especially from the U.S.A. and Canada.
- The **U.S.A.** is the **largest exporter** of wheat, followed by Canada andAustralia.
- Most of the exported wheat goes to Japan, China, India, the U.K. and West Germany.

(b) BEVERAGE CROPS

1) SUGARCANE

➡ Growing conditions of sugarcane.

- Temperature: **21°C to 27°C**.
- Altitude: **0 to 1600m** above sealevel.
- Soil: well-drained soil.
- Rainfall: a minimum of **1250mm** if the crop is to be grown without irrigation.
- A rainfall **over 2000 mm is too much** for the crop as it tends to **dilute** the sugar.
- Dry, sunny season. This **increases** the accumulation of the sugar.

➡ Source of sugarcane

- 80% of world's sugar production comes from sugarcane botanically known as **Saccharum officinarum**, and most of the rest is made from sugar beet.
- Sugar cane is a tall perennial, grass family that forms lateral shoots at the base to produce multiple stems. It has stout fibrous segmented stalk rich in sugar.
- Mature cane stalk is 3 to 4 meters tall and 5 cm in diameter and it typically takes about 12 months to reach maturity.

➡ Cultivation of sugarcane

- Sugar cane is cultivated in the tropics and subtropics in areas with a plentiful supply of water, and it does not tolerate severe frost.
- Most of the world's sugar cane is growing between the latitude of **22°N** and **22°S**, and some up to **33°N** and **33°S**. In terms of altitude, sugarcane crop is found up to 1600 m close to the equator in countries such as Colombia, Ecuador and Peru.

-
- 1.Mohamed-Taharo
 2. Mohamoudkader
 3. Mustafe –Agro
 4. Cumar caynaan

Page

➡ Harvesting

- The canes are cut off a few centimetres above the ground level.
- After the canes are cut, the leaves are removed and these are often used as fodder for cattle.
- The canes are cut either by hand or by machine.
- In the factory the cane is cut into small lengths and is passed through a crushing machine which extracts the juice, which is then purified and boiled until the sugar crystallizes.
- The thick syrup which remains is called **molasses** and when this is removed a crystalline residue of raw sugar remains.
- **Molasses** is **used** for making alcohol.
- It is also mixed with other substances to make an excellent animal food.
- The residue of cane is known as **bagasse** and this is sometimes manufactured into **papers**.



© dreamstime.com

ID 128663694 © Phooanotpics

➡ PROCESSING SUGAR CANE IN THE FACTORY

- Sugarcane processing passes through **two** stages, namely **milling and refining**.

1- Milling the sugarcane

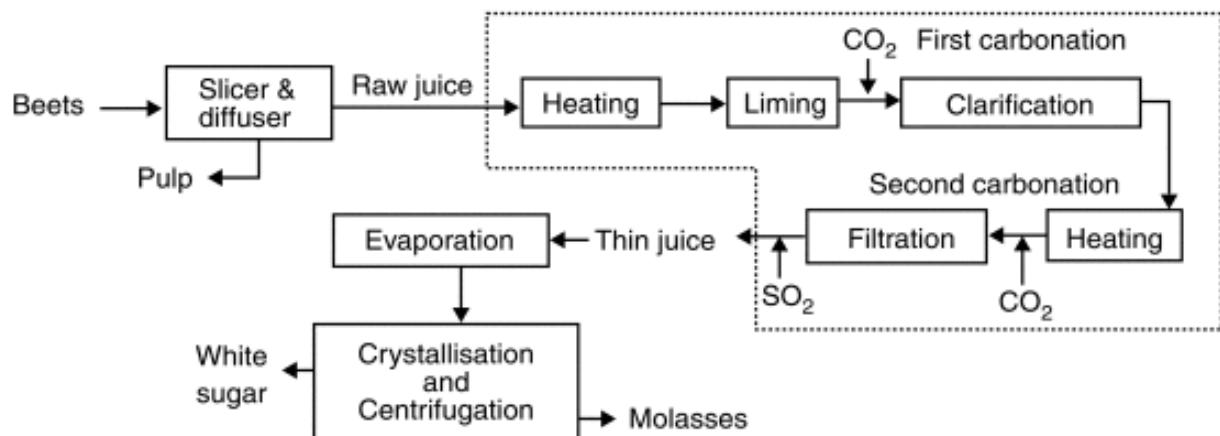
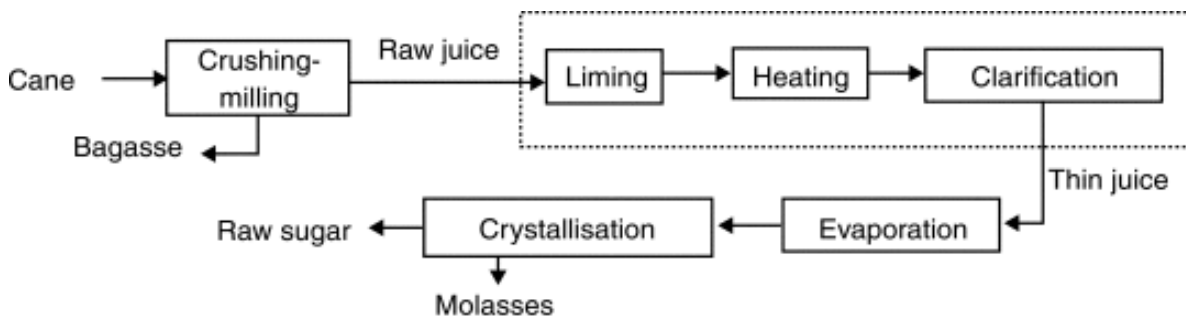
- Milling stage takes place at sugar extraction mills that extract a raw sugar and a mill-white sugar through such processes as:
 - a) **Shredding** fresh cane chops into smaller pieces by shredder
 - b) **Crushing and grinding** cane to extract the juice by a series of rolling crushers and grinders called the **milling train** and with the addition of water, a **bagasse** and an **impure juice** is produced.
 - c) **Boiling and clarifying** the mixed juice takes in boiler and clarifier tanks, in which **lime** is added to remove impurities and produce a **clear sugar juice** and **mud or solid juice** in the boilinghouse.
 - d) **Evaporating and colorization** of the pure sugar juice by adding **SO₂**, (color-inducing) occurs in a number of evaporator to form a crystallized raw sugar and **molasses**.

2- Refining the raw sugar

- The raw sugar is sent to the curing house for further purification or intended for local consumption.
 - a) **Centrifuging** to separate the mixture of the raw sugar and the heavy molasses syrup is followed by washing away the outer coating of sugar crystals in the centrifugal chambers, and this process is known as **affination**.
 - b) **Precipitating** the sugar solution by adding both phosphoric acid and calcium hydroxide (**phosphotation**) or by using carbon dioxide and calcium hydroxide (**carbonation**) to produce calcium phosphate or calcium carbonate precipitate that entrap and absorb impurities and skimmed off as they float at the top of the tanks.
 - c) **Filtering** any remaining solids from the clarified sugar and the final molasses in which still contains 20-30% sucrose and 15-25% glucose and fructose.

d) **Concentrating** to super saturation and **crystallizing** the purified sugar solution (brown) is then **decolorized** by filtration through activated carbon to form the **white refined sugar**.

- Finally, the white sugar is heated in a rotary dryer and blown cool air through it for several days to produce granulated white sugar crystals.
- Then sugar passes through inspection, bagging, packaging, loading wholesaling and retailing.



➡ By-products of sugarcane

1. **Bagasse** the residual dry fiber of the cane after cane juice has been extracted.

Uses of the bagasse

- a) fuel for the boiler and kilns
- b) making papers
- c) agricultural mulch
- d) raw material for production of chemicals

2. **Molasses** is produced in two forms: blackstrap and purer molasses syrup.

Uses of blackstrap molasses

- a) Food and dietary supplement
 - b) Ingredient in animal feed
 - c) To produce ethanol and rum
 - d) Manufacturing of citric acid
 - e) Sugarcane wax
- **Purer molasses** syrups are sold as molasses, and may also be blended with maple syrup, invert sugars, or corn syrup. Both forms are used in baking.
 - It can be used as biofuel alternative to gasoline and is widely used in cars in **Brazil**.

➡ GROWING REGIONS OF SUGARCANE

- The commercial production of sugar cane takes place in **four** main areas.
 1. The Caribbean region (Cuba, Dominican Republic, Barbados and Jamaica).
 2. Latin America (Mexico, Peru, and Brazil).
 3. Asia (India, Pakistan, Bangladesh, Taiwan, the Philippines and China).
 4. The Australasia Pacific region (Australia and Hawaii).

-
- 1.Mohamed-Taharo
 2. Mohamoudkader
 3. Mustafe –Agro
 4. Cumar caynaan

Page

- The **largest producers**, such as **India** and **Brazil**, are not necessarily the main exporters.
- The **largest exporters** are **Cuba** and other Caribbean producers, and Australia.

➡ **Top producers of sugarcane**

1. India	4. China	7. Philippine	10. Colombia
2. Cuba	5. Mexico	8. Pakistan	11. South Africa
3. Brazil	6. U.S.A	9. Australia	12. Dominica Republic

2) **TEA**

- The tea plant is an evergreen shrub which may by pruning is kept to a height of about 1.5m.
- The plant grows best in tropical and sub-tropical monsoon regions.

➡ **Growing conditions of tea**

- Temperature: **15°C to 30°C**.
- High rainfall: **1500mm**.
- **Altitude: 1500 m to 2000 m** above sea level.
- **Soil:** deep well drained soil.
- Presence of **wind breakers** to protect tea bushes from strong wind.

➡ **Cultivation of tea**

- The plant is grown from seed in a nursery. When it is about **0.3 m high**, it is transplanted into sloping land. After about **3 years** the plant is mature, and its leaves are ready for picking.

➡ **Varieties of tea**

1. *Camellia sinensis* which is used for most Chinese and Japanese teas.
2. *Camellia assamica* used in India.

➡ Picking and processing:

- The young leaves at the tips of branches are the first to be picked.
 - Tea may be processed into **two forms**— **green tea** and **black tea**.
 - When the leaves are brought to the factory they are dried on trays, either in the sun or in heated rooms. This is called **withering** and it causes the leaves to lose most of their moisture and to become soft so that they do not break when rolled.
1. If **black tea** is required, the leaves are allowed to 'ferment' to reduce the tannic acid content.
 - Fermentation is stopped by roasting the leaves which cause them to turn black.
 2. If **green tea** is required, the fermentation stage is omitted.

➡ Tea growing regions and trade

- There are small tea-growing regions in Kenya, Brazil, the C.I.S. and in Northern Argentina.
- The **largest tea exporters** are **India** and **Sri Lanka**.
- The U.K. is one of the largest tea importers and most of its tea is imported from India and Sri Lanka and Bangladesh.
- Australia and West European countries also import their tea from these countries.

➡ East and South Asia regions

1. **India**
 - a) The **Darjeeling** district on the southern slopes of **Himalayan** foothills
 - b) On the slopes of **Assam Hills** along the **Brahmputra** valley
 - c) On the **Nilgiri** and **Cardamon Hills** of the south
2. **Central Sri Lanka** around Kandy
3. **China** on the Yangtze Basin
4. **Japan** in southern Honshu
5. The **C.I.S** around the black sea where winters are mild
6. **Indonesia** in west Java
7. **Bangladesh**

3) COCOA

- The fruit of the cocoa tree is a **pod** about **20 cm** long. It contains seeds, called beans. When processed the beans produce a powder which is called cocoa. The pods grow directly on the trunk and branches of the tree.
- Its botanical name is **theobroma**.
- **Originate** from **Latin America**, but extensively cultivated in **West Africa**.
- In the gold coast, modern Ghana, cocoa was introduced by an African, **Tetteh Quarchie**.

➡ Types of cocoa

1. **Forastero**, comprising 95% of the world production of cocoa.
2. **Criollo**, plantations have lower yields than those of Forastero, and also tend to be less resistant to several diseases that attack the cocoa plant.
3. **Trinitario**, is hybrid between Criollo and Forastero varieties. It is much higher quality both Criollo and Forastero.

➡ Growing conditions of cocoa

- A mean annual temperature of about **26°C** with range less than **10°C**.
- An annual rainfall of at least **2000mm**.
- **No strong** wind (such winds could easily damage the pods).
- Deep well-drained soils which are rich in potash.

➡ The cultivation of the cocoa tree

- Cocoa trees are usually grown from seeds which are sown in a nursery. After seeds germinate, the seedlings are allowed to grow to a height of a few centimetres before these are transplanted into a piece of forest which is cleared of all plants except tall trees which provide shade for these seedlings.
- Some cocoa trees are grown from cuttings which are planted direct into the cleared forest land.

- After about **5 years** the young trees bear their first pods but they **do not** come into full production until they are about **8 years** old.
- Good trees can remain in commercial production for about 30 years.

➡ Picking and processing

- The cocoa pods are cut from the trees **twice a year** after which they are split open so that the beans can be extracted. The beans are spread on trays in the sun to allow the pulp to drain away and the beans to ferment, after which they are dried and packed. The beans are taken to the factories where they are cleaned, roasted and cracked so that their hard skins, are called hulls, can be removed. The beans are then crushed and ground into a paste, after which the fat, which the beans contain, is separated out. This forms a solid fat called **cocoa butter**. The remainder of the paste is dried to a powder, called cocoa. **Cocoa butter is used** for making cosmetics and other similar goods. **The powder is used**, together with cocoa **butter milk** and sugar for making chocolate.

➡ Cocoa regions and trade

- The **chief** cocoa **regions** of the world are **West Africa**, especially **Ghana** and **Nigeria** which together produces one half the world's output of cocoa beans, and parts of Central America, the West of Indies, Brazil, Venezuela and Ecuador.
- Most of the cocoa beans produced are exported to the U.S.A. and Western Europe.

➡ Cocoa production

- The largest producers and exporters of cocoa are Ghana, Nigeria, Brazil, Ivory Coast, Cameroon and Ecuador.
- **Ghana** is the **world's largest** producer of cocoa beans.
- The cocoa farms of a Ghana employ almost half a million workers and the export of cocoa beans forms more than 50% of Ghana's total exports by value.
- Most of the exported beans leave the country from the ports of Tema and Accra.

► **Protection technique for shipping and storage**

1. Fumigation with methylbromides
2. The application of pyrenoids
3. Hermetic storage in sealed bags (airtight)

4) **COFFEE**

- The coffee plant is a perennial shrub which is extensively cultivated in latitudes between **30°S** and **28°N**. The shrub is pruned to a height of about **2m**, and after flowering the shrub produces clusters of berries along its branches. The coffee plants grow best in tropical and sub-tropical regions.

► **Growing conditions of coffee**

- ✓ High rainfall: **1000 mm** to **2000mm**.
- ✓ High altitude: **1000m** to **2300 m** above sea level.
- ✓ Cool to hot temperature: **15°C** to **30°C**.
- ✓ Soil: deep, well drained fertile soil.
- ✓ Availability of labour during harvesting.

► **The cultivation of coffee**

- The plants are grown from seeds which are sown in nurseries.
- About **6 months** after germination, the young seedlings are **transplanted** into the plantations where they grow under tall trees, which provide shade to protect them from the sun. The trees **bear fruit** in the **fifth year**.
- During this period they are pruned and the soil around is manured.

► **Types or varieties of coffee**

1. **Arabica** coffee beans are cultivated mainly in Latin America, eastern Africa and Asia.
 2. **Robusta** beans are grown in central Africa, throughout Southeast Asia and Brazil.
- **Varietals** (sub-species) are generally known by the region in which they are grown, such as Colombian, Java and Kona.

➡ Picking and processing

- When the berries are ripe, they are either picked by hand or by shaking the branches. The berries do not ripen all at the same time and several pickings take place over a two or three month period. The berries are cured by spreading them out on trays which are left in the open for about **3** weeks. The trays are covered at night to protect the berries from rain or dew. When the berries are cured, the dried pulp is removed by machines to release the coffee beans. Before the beans can be used they have to be roasted and ground.
- **Dried coffee berries** are **processed** by either one of **two methods**:
 1. **Dry process method**: the pulp is removed by machine to release the beans, which are roasted to varying degrees, depending on the desired flavor.
 2. **Wet process method**: the berries are fermented by putting into water to remove the pulp, after which beans are dried in the open air.
- Coffee is slightly acidic and can have a stimulating effect on humans because of its **caffeine content**.

➡ Coffee regions and trade

- Most of the world's coffee is grown on the tropical highlands of Latin America and Africa at heights from 450 to 750m above sea level.
- The largest **producer** and **exporter** is **Brazil** followed by **Colombia, Ivory Coast, Uganda, Angola, Mexico, Indonesia, Ethiopia, India**, and **El Salvador**. Also, other African producer countries include **Zambia, Kenya** and **Zaire**.
- U.S.A is the largest **importer** of coffee from **Brazil** and followed by W. Germany, France, Italy, Sweden and Holland.
- **The international coffee agreement** was set up in 1962, to operate controls to regulate the production and prices of coffee.

(c) OILCROPS

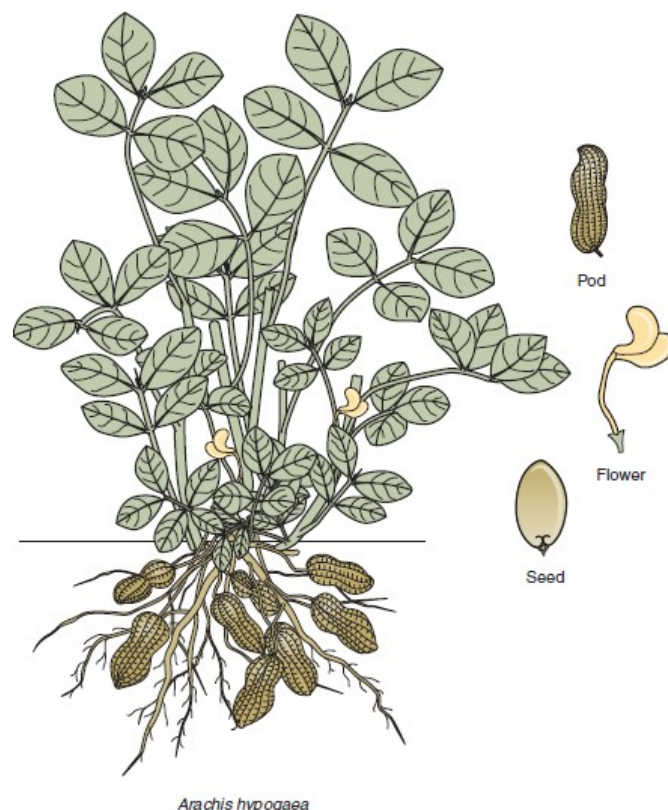
1. Groundnut
2. Sesame (simsim)
3. Oilpalm

1. **GROUNDNUT**

- **Scientific name:** *Arachis hypogaea*

➡ Growing conditions of groundnut

- Rainfall: **500mm**
- Temperature: average temperature of about **26°C**.
- Soil: well-drained soil.
- Altitude: **1500 m** above sealevel.



➡ Origin and distribution

- The cultivated peanut or groundnut (*Arachis hypogaea* L.), originated in South America (Bolivia and adjoining countries) and is now grown throughout the tropical and warm temperate regions of the world. This crop was grown widely by native people of the New World at the time of European expansion in the sixteenth century and was subsequently taken to Europe, Africa, Asia, and the Pacific Islands. Groundnut was introduced to the present south-eastern United States during colonial times. Groundnuts were grown primarily as a garden crop in the United States until 1870. As a field crop, the crop was frequently used for pig pasture until about 1930. In South Africa, groundnuts are grown in the summer rainfall regions under irrigated or rainfed conditions. Resource-limited farmers, especially in the northern and eastern parts of South Africa, grow groundnuts mainly for their own consumption.



- 1.Mohamed-Taharo
2. Mohamoudkader
3. Mustafe –Agro
4. Cumar caynaan

2. **SESAME**

➡ Sesam (*Sesamum indicum*) is a flowering plant in the genus *Sesamum*, also called *benne*. Numerous wild relatives occur in Africa and a smaller number in India. It is widely naturalized in tropical regions around the world and is cultivated for its edible seeds, which grow in pods. World production in 2016 was 6.1 million tonnes, with **Tanzania, Myanmar, India, and Sudan** as the largest producers.

➡ **Growing conditions of sesame.**

- **Rainfall:** 400 mm to 500 mm, moderately drought resistant.
- Grows best with **750mm**.
- Warm temperature: **25°C to 30°C**.
- **Altitude:** 1500 m above sea level
- Grows best on medium to light, well-drained soils.
- Prefers pH 5-8.
- Does not tolerate salinity or standing water (**waterlogging**).

➡ **Origins**

- Sesame seed is considered to be the oldest oilseed crop known to humanity. The genus has many species, and most are wild. Most wild species of the genus *Sesamum* are native to sub-Saharan Africa. *S. indicum*, the cultivated type, originated in India.

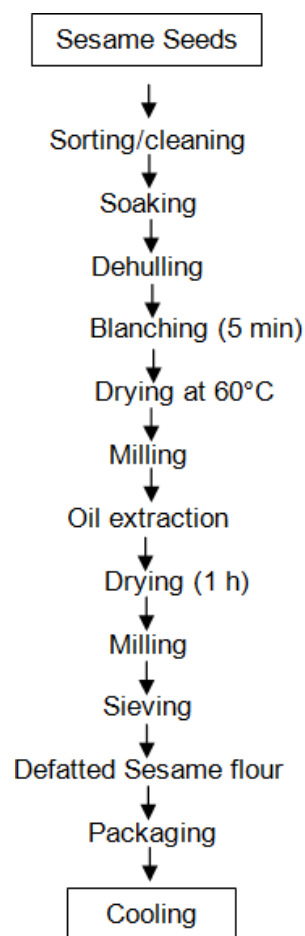
➡ **Sesame processing**

- **CLEANING:** After harvesting, the sesame seeds are cleaned and hulled. The first stage of the hulling process is cleaning. The sesame seeds pass through an air separation stage to remove any foreign particles.
- **HULLING:** In the hulling process a combination of water and friction work together as the seeds are passed against the chamber of the hulling machine to separate the hull from theseeds.
- **DRYING:** Drying is one of the most important stages in processing to ensure high quality. Further there is the chance of forming poisoning bacteria on some spices

which is a real danger if proper washing and drying is not done. For drying we use auto dryers.

- **SORTEXING:** Aspiration, Destoner and Gravity machines with the help of which the seeds are graded by size, density, colour and flavour supplying consistently high quality sesame.
- **PACKING:** Packaging becomes very important in case of food products. It is ensure safe packaging of all our products, to ensure that products remain free from contamination and leakage. For packing Sesame Spices and related products poly-packs and multiwall paper bags, Jute bags are used.

Extracting from sesame seed



3. OILPALM

- The oil palm is a **tropical tree** whose botanical name is *Elaeis guineensis*. Its origin is traced to **West Africa**. The tree is widespread throughout the lowlands of equatorial Africa up to the eastern borders of the Democratic Republic of Congo where it grows at an **altitude** of about **1000 metres above sealevel**.
- The oil palm tree can grow very tall, sometimes beyond **8 metres**. Its fruit is **egg-shaped** and grows in bunches with each bunch carrying up to **1000 fruits** which weigh about **50 kilograms**. The fruits are **oily** to the touch.
- **Nigeria** is the **second** leading **exporter** of palm oil after **Malaysia**.
- Most of the oil is imported by the industrial countries of **Western Europe** and **U.S.A.**

➡ Conditions favoring oil palm farming

A. *Physical factors.*

- **Temperature:** over 21⁰C throughout the year.
- **Rainfall:** over 2000 mm per year.
- **Altitude:** 1000 metres above sealevel
- **Humidity:** high relative humidity.
- **Soil:** well-drained, porous soil rich in humus.
- **Windbreak:** trees should be planted at the edge of the plot.
- **Relief:** undulating land which is less exposed to strong winds.

B. Human requirements

- **Labour:** the labor is needed for clearing the land, tendering seedlings and regular weeding.
- **Transport:** a proper road network within the plantations and in the villages is essential. Vehicles to transport the fruit must also be available.
- **Factories:** processing factories should be located within the growing areas. Oil palm fruits are very perishable and must be processed the same day.

-
- 1.Mohamed-Taharo
 2. Mohamoudkader
 3. Mustafe –Agro
 4. Cumar caynaan

Page

- **Management:** the crops must be inspected frequently for any disease or pest attack. Spraying has to be done regularly to control the spread of pests and diseases.
- **Capital:** money is required to maintain the vehicles, factors and laborwages.

➡ **CULTIVATION**

- The oil palm tree is a **perennial crop**. Once it is planted it may continue producing crops for more than **30 years**. Oil palm seeds are planted in a nursery and remain in the nursery for at least one year before they are ready for transplanting in the field.
- The trees which are grown on large-scale farms and small estates are shorter and grow up to **7.5 m** in height. These trees take a shorter time to mature. If well looked after, these trees bear fruits after **3.5 to 4 years** after planting. At **10 years** they have reached full maturity and will continue to produce fruits for another **30 years**. The wild but domesticated variety which is tendered by a majority of smallholders grows taller up to **15 metres**. These trees take between 8 and **10 years** to maturity.

➡ **Harvesting**

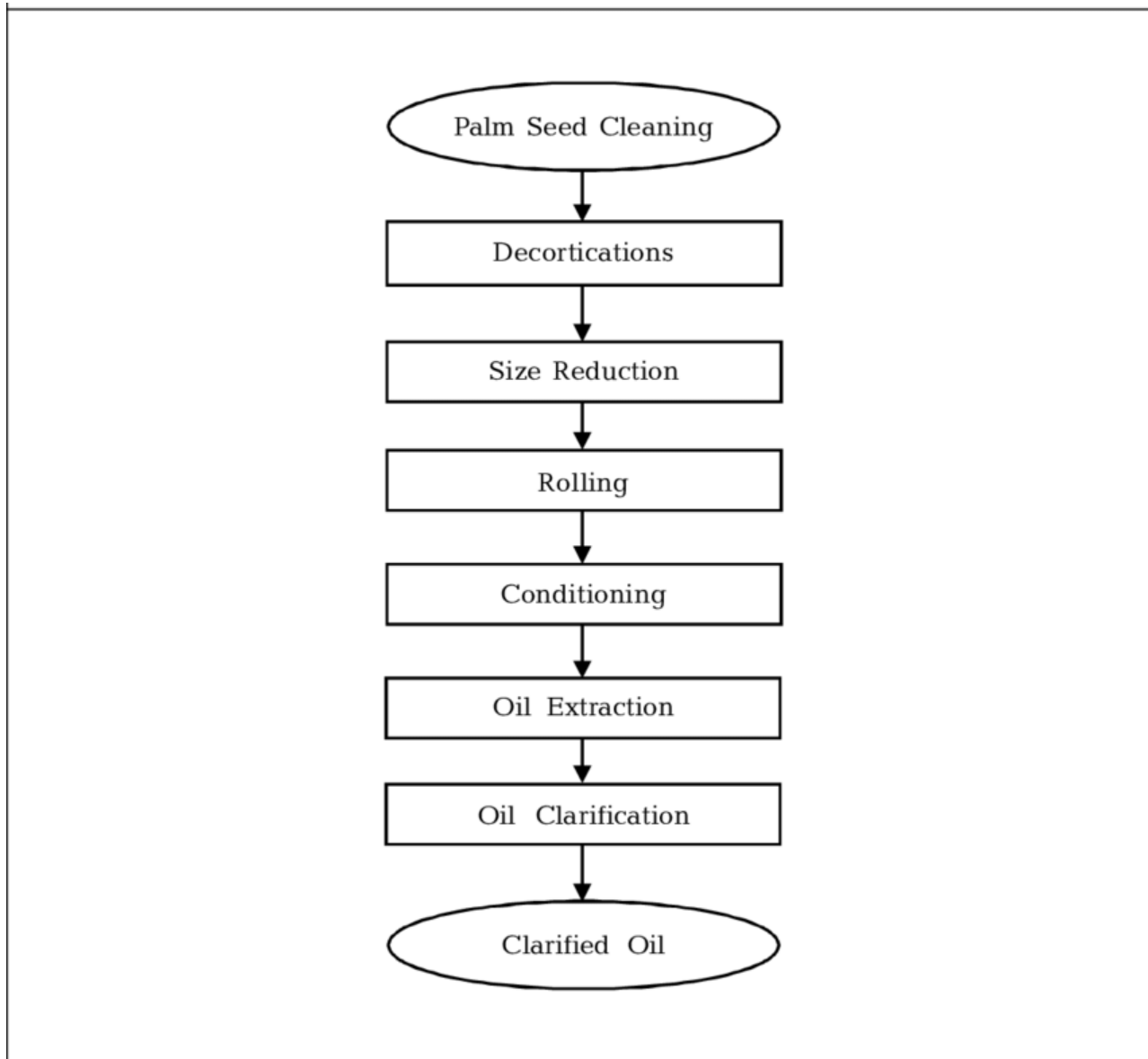
- The oil palm fruits are known to be ripe when they change their color to deep orange or red. Plenty of sunshine is essential for the fruits to ripen.
- Harvesting is done by cutting the base of the bunch using knife which looks like a chisel. Fruits are harvested every **5 to 10 days**. Harvesting goes on all year round and each tree bears fruit head once a week.

➡ **Processing of oil palm**

- Palm oil is contained in two parts of the fruit– in the pericarp and in the kernel. The pericarp is a fibrous fleshy outer coating. The kernel is a nut which is inside the pericarp. It is surrounded by a hard shell.

➡ Methods of extracting oil from oil palm

- There are **three** methods of extracting oil from the palmfruit.
 1. Traditional
 2. Use of handpressure
 3. Use ofmills



(d) HORTICULTURAL CROPS

- Horticultural crops are the perishable crops which are mostly marketed within the country to earn income.

➡ Types of horticulture

1. **Floriculture:** is the growing of flowers.
2. **Olericulture:** is the growing of vegetables.
3. **Pomoculture:** is the growing of fruits.

➡ Pomoculture

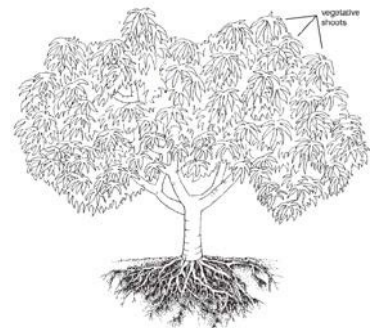
1. Mango
2. Banana
3. Guava
4. Lemon
5. Grapes

1. **MANGO**

- Mango tree is a tropical perennial, evergreen plant which bears a juicy fruit resembling an apple.
- A **mango** is a juicy stone fruit (**drupe**) produced from numerous species of tropical trees belonging to the **flowering plant** genus *Mangifera*, cultivated mostly for their edible fruit.
- **Scientific name:** *Mangifera indica*
- The genus belongs to the **cashew** family **Anacardiaceae**

➡ Growing conditions of mango.

- Altitude: **0 to 1500 m** above sea level.
- Rainfall: as low as **650 mm** is acceptable.
- Mean annual temperature: 40°F to 50°F
- Soil: well-drained soil with pH: **5.5 to 7.5**
- Frost free growing period
- Dry period for flowering and fruiting.



-
- 1.Mohamed-Taharo
 2. Mohamoudkader
 3. Mustafe –Agro
 4. Cumar caynaan

Page

➡ Cultivation of mango

- Mango is grown from its seeds in a nursery where the young seedlings are watered every day. The mango seedlings are grafted before transplanting into the field. Mango trees are pruned to sprout more terminal branches for keeping the tree manageable size and shape. Flower is triggered by cool night.

➡ Harvesting mango

- Mango is harvested when its color changes into yellow, red or even when green to ripen room temperature of between 18°C to 22°C.

Disease	Signs	Management
anthracnose	• Leaves show oval or irregular, greyish-brown spots which may coalesce to cover larger area of the leaf. The affected leaf tissues dry and shred. Leaves on infected petioles droop and fall. • Black spots appearing on skin of the affected fruits gradually become sunken and coalesce.	• Before storage, treat with hot water, (50-55°C) for 15 minutes. • Spray fungicides on flowers and bunches.
Powdery mildew	• White superficial powdery fungal growth on leaves, stalk of panicles, flowers and young fruits. The affected flowers and fruits drop prematurely reducing the crop load	• Dusting the plants with fine sulphur at the rate of 0.5 kg/tree. • Other fungicides can be used.

Pests	Control
-------	---------

Hopper, mealy bug, fruit fly, scale insect, shoot borer, leaf webber and stone weevil.	1. Biological control 2. Chemical control
--	--

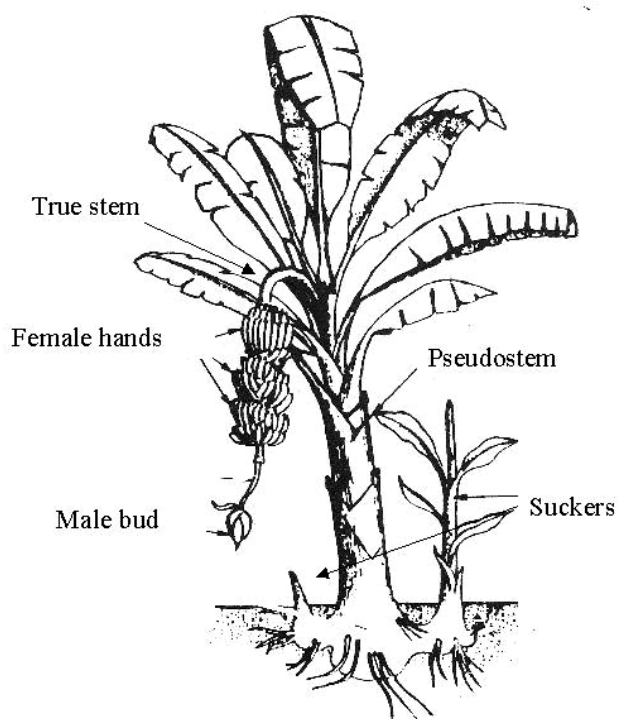
2. BANANA

- Growing bananas does not require much effort but to achieve high yields requires skills, dedication, and proper planting methods. Below are some pertinent guides that any Banana growers should be aware of.

➡ Agro Climate&Soil ➡

AgroClimate

- Bananas need warm subtropical climate, adequate moisture and protection from wind.
- Most varieties of Bananas grow best with 12 hours of bright light and high humidity of 50% or higher.
- The ideal temperature range is around 26-30°C (78-86°F) with RH regime of 75- 85%. Growth begins at 18°C, reaches optimal growth at 27°C and stop entirely when temperature reaches 38°C.
- Although Bananas grow best in bright sunlight, high temperature will scorch leaves and fruit.
- For best appearance and higher photosynthetic rate, wind protection is advisable. High velocity wind which exceeds 80km per hour damages the leaf.
- Bananas are also vulnerable to being blown over due to the weight of the stem of fruit.
- Thus, **Propping** should be done during the last few months of its life cycle before harvest.



➡ Soil

- Bananas need rich, moisture and well-drained soil with 40% clay, 75% silt, 85% loam.
- Bananas prefer a more acidic soil with pH between 6-7.5. Low pH soil makes banana more susceptible to Panama disease. Avoid soil that is sandy, salty, nutritionally deficient and ill-drained soil. If soil is not in the most favorable condition, improve it! Light sandy soil can be improved by placing mulch around the Banana plants. This will improve water retention and prevent nutrients from percolating quickly into the soil. Nutritionally deficient soil can be improved by incorporating organic matter to the soil before you plant your Bananas and then mulch them thickly. This process should be repeated as often as possible. Bananas do not tolerate waterlogging because its roots will rot. This however can be resolved by planting the Bananas in raisedbeds.

➡ Varieties

- Bananas come in many varieties, therefore selection of the species should be based on its demand and yields. The most commonly cultivated Bananas are **Berangan** and **Canvendish**.

➡ Planting

➡ PlantingMaterial

- The best way is to start with tissue culture plantlets. Tissue culture plantlets are recommended for planting because suckers, in general, are infected with some soil-borne pathogen and nematodes. Tissue culture plantlets are healthy, pest and disease free, uniform and shorter harvesting period. Suckers on the contrary are not uniform and have a rather longer-harvesting period thus management of the plantation can be somewhat wearisome.

➡ PlantingTime

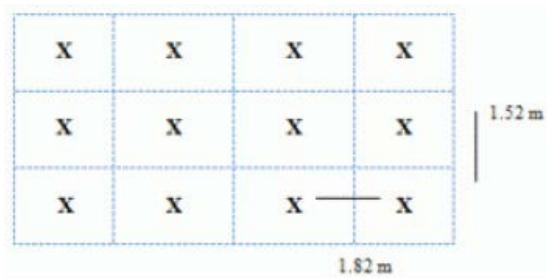
- Tissue culture Bananas can be planted throughout theyear.

➡ Nutrients Required By Bananas

- Bananas need nitrogen, phosphorus, potassium with a ratio of 3:1:6 and other micronutrients to ensure the plants grow vigorously.

➡ Crop Geometry

- The most economical and efficient spacing is 1.82m x 1.52m with 3,630 plants per hectare (a wide spacing of 1.82 m between rows).



3. GUAVA

- The Guava, botanically known as **Psidium guajava** belongs to the family of **Myrtaceae**. Contains about **100 species** of tropical shrubs and small trees. Guava fruits were used for both eating fresh and also for processing.

➡ Growing conditions of guava

- Temperature:** Optimum vegetative growth occurs between **15** and **28°C**.
- Altitude:** from sea level up to an altitude of **1500 m**.
- Grow best in areas with an annual rainfall of **1000 to 1500mm**.
- Guavas grow well in any type of soil. **Well drained soils** are the best.
- Tolerates **salinity** and **alkalinity**.
- Trees need **full sun exposure**.
- Planting material:** Layers and seed.
- Spacing:** 5 – 6 m either way.

➡ Origin and distribution

- Guavas originated from an area thought to extend from **Mexico** or **Central America** and were distributed throughout **tropical** America and the **Caribbean region**. They were adopted as a crop in **tropical** and **subtropical** areas

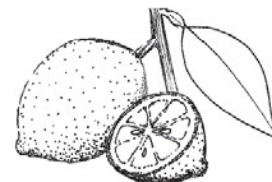
4. LEMON

• What is citrus?

- It is a collective name for different many species and their crosses under the genus *Citrus* and family **Rutaceae**.

- Origin:** South East Asia.

- Major producers** are: Brazil (1st), USA (2nd) and China (3rd)



➡ General botany of citrus fruits

- Citrus has **two** subgenera
 1. *Eucitrus*.
 2. *Papeda*.
- Papeda** is **inedible** because of the acrid oil in juice sacs which is bitter.
- Eucitrus** is the **edible** citrus and has 10 spp out of which 8 spp are cultivated.

Botanical Name	Common Name
1. <i>Citrus sinensis</i>	Sweet orange
2. <i>Citrus aurantifolia</i>	Lime (lomi)
3. <i>Citrus limon</i>	Lemon (Fernj lomi)
4. <i>Citrus aurantium</i>	Sour orange or bitter orange
5. <i>Citrus reticulata</i>	Mandarin or tangerine
6. <i>Citrus paradisi</i>	Grape fruit
7. <i>Citrus Medica</i>	Citron
8. <i>Citrus grandis</i>	Shaddock (pummelo)

➡ USES OF CITRUSFRUITS

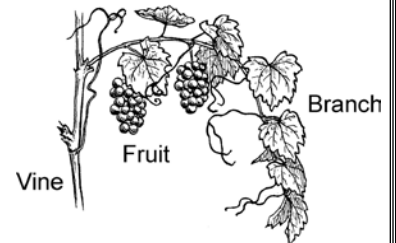
1. Good source of vitamin "C" and energy- source of food
2. For extraction of essential oils from the peel or flowers.
3. Cattle feeds
4. Means of employments
5. Raw material for agro-industries
6. Sources of incomes

➡ Growing conditions of lemon

- **Temperature:** optimal growing temperature is **15-30°C**.
- **Rainfall:** 1150mm-1500mm per annum with even distribution
- **Soil:** well-drained fertile soil.
- **Altitudes:** 0 to 2000 m above the sea level.

5. GRAPE

- A **grape** is a fruit, botanically a **berry**, of the **deciduous woody vines** of the **flowering plant** genus *Vitis*.
- Grapes can be eaten fresh as **table grapes** or they can be used for making **wine, jam, grape juice, jelly, raisins, vinegar,** and **grape seed oil**. Grapes are a **non-climacteric** type of fruit, generally occurring in clusters.



➡ Varieties of grapevine

- Most grapes come from cultivars of *Vitis vinifera*.
- *Vitis amurensis*
- *Vitis mustangensis*
- *Vitis riparia*
- *Vitis rotundifolia*

-
- 1.Mohamed-Taharo
 2. Mohamoudkader
 3. Mustafe –Agro
 4. Cumar caynaan

Page

➡ Growing conditions of grape

- Grapevines require deep, well-drained soil with a minimum of **75 cm** to **1 m** of permeable soil with no impeding layers
- They grow well in a **sandy loam** soil with average fertility.
- PH of **5.5 to 6.0**.

➡ MAJOR PROBLEMS THAT HINDER CROP FARMING IN SOMALILAND

1. Lack of fertilizer use
2. Making wrong decisions over the crop type to be grown in each year
3. Bad land preparation
4. Lack of capital investment
5. Growing a single crop on the same plot of land
6. Lack of equipment used for irrigation
7. Unreliable rainfall and water scarcity
8. Local market competition for foreign crop products imported by ignorant citizens from Ethiopia, Yemen and Somalia.
9. Lack of pesticides for protecting crops from insects
10. Poor storage equipment used for the harvest
11. Failure to plan marketing of farm products
12. Seasonality of produce
13. Changes in demand and supply
14. Delayed payments
15. Lack of knowledge
16. Pests and disease attack.
17. Fluctuation of price due to overproduction.
18. Poor transport network which delays delivery.
19. Shortage of labour during harvesting.
20. Droughts which destroy crops.
21. Corruption and mismanagement

➡ **SOLUTIONS OF PROBLEMS IN AGRICULTURAL PRODUCE**

1. Establishment of co-operatives
2. Establishment of stabilization funds
3. Establishment of international agreement or trade blocks
4. Proper education of the farmers
5. Proper regulation of cheap importation
6. Improving access to market information
7. Building appropriate and sufficient storage facilities
8. Choice of the crop and variety should be made on the basis of climatic and edaphic conditions of the site of orcharding.
9. Provision of windbreak and shelter belts for areas prone to wind damage.
10. Before planting an orchard soil should be brought to optimum by incorporating organic matter, amendments and nutrients based on soil analysis.
11. In case of problems of pollination, a mixture of varieties should be grown by introduction of effective pollinizer varieties and pollinators (Honeybees).
12. Unfruitfulness due to slow growth of pollen tube, premature and delayed pollination, use of plant regulators can be affected after standardization in terms of chemical concentration and timing of application.
13. The problem due to old age could be overcome by replanting or rejuvenation of old trees.
14. Problem due to overbearing can be managed through thinning at appropriate stage.
15. Irrigation management would be key role in situations with drought and waterlogged conditions.
16. Problem due to uneven distribution of flowers on tree should be managed through thinning and crop regulation.
17. Maintenance of critical nutrient status in tree leaves for optimum crop production by adopting correct nutritional programme based on plant and soil analysis.
18. Unfruitfulness due to pathogens should be managed through effective plant protection measures following integrated approach.

➡ ANIMAL FARMING

- Livestock farming involves keeping or rearing of domesticated animals on a farm.

➡ Types of livestock farming.

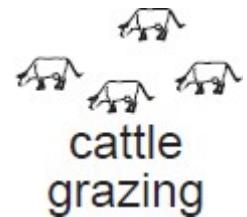
- (a) Commercial livestock farming
- (b) Pastoral farming.

➡ Commercial livestock farming

1. Cattle farming.
2. Sheep farming.
3. Poultry farming.

➡ Cattle farming

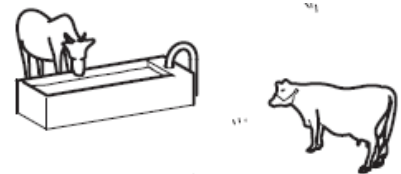
- ✓ Grass is the natural food of cattle and because of this they are reared in almost all temperate and tropical grassland.
- ✓ It is estimated that there are about 1000 million cattle in the world of which over 150 million are in India
- ✓ **Most** of cattle in **India** are **undernourished**.



➡ COMMERCIAL CATTLE FARMING

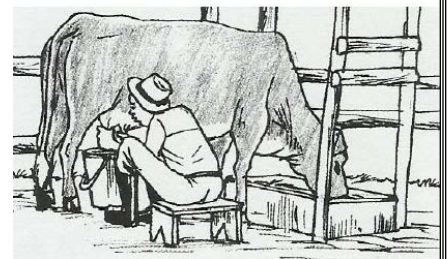
1. Beef cattle farming

- Beef cattle farming involves rearing cattle for meat.
- ✓ **Australia** and **Argentina** are most **important beef-exporting** countries to Europe and North America because these continents are unable to produce sufficient beef to meet their requirements.



2. Dairy cattle farming.

- Is the practice of keeping cattle for milk and milk products such as butter and cheese



-
- 1.Mohamed-Taharo
 2. Mohamoudkader
 3. Mustafe –Agro
 4. Cumar caynaan

Page

➡ **Sheepfarming**

- ✓ Sheep can live under a great many types of climatic conditions, but they cannot tolerate very cold climates or very hot or humid climates.
- ✓ Sheep are reared therefore in almost every part of the world except the polar and equatorial regions.

➡ **The main sheep rearing regions.**

- ✓ The rearing of sheep on a commercial basis is concentrated in the temperate grasslands which have an annual rainfall of from 350 mm (14 in) to 750mm.
- ✓ Sheep per unit area depends on the amount of rain, that is, the number in areas of low rainfall is smaller than the number in area with high rainfall.

1. **Australia.**

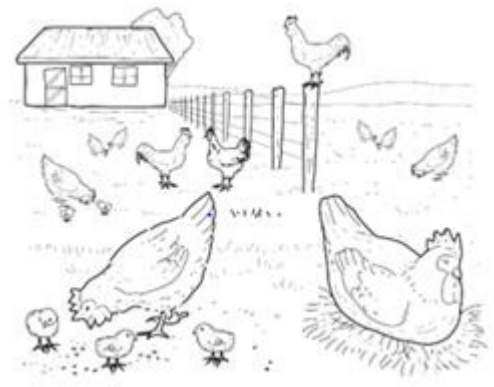
- This country has approximately 150 million sheep which makes it one of the most important sheep rearing countries in the world.
- Most of the sheep are reared for their wool.

2. **New Zealand.**

- The sheep farms of New Zealand produce both meat and wool.
- The country exports more frozen mutton and lamb than any other country and the total value of all sheep products is over 50% of the country's total export.

➡ **Poultryfarming**

- Poultry farming refers to the rearing of turkeys, ducks and chicken, for meat and egg production.
- Poultry can be reared in most temperate and tropical climates but turkeys are susceptible to damp.



➡ **PASTORALISM**

- Pastoralism is the rearing of animals and moving from place to place to find water and pasture.

➡ **Types of pastoralism**

1. Nomadic pastoralism
2. Sedentary pastoralism
3. Transhumance pastoralism
4. Commercial pastoralism

➡ **Factors influencing pastoralism in Somaliland**

1. Grazing areas are free from pests especially tsetse flies for being dry and hot.
2. Savannah grassland and semi-desert conditions which cause grass to sprout during rains and drying hot season.
3. Availability of grass most times of the year in the bush and wooded savannah.
4. Gentle or relatively flat terrain of the areas which makes it easy for the movement of animals from one place to another.
5. Sparse population of **N** and **N.E** region due to harsh climatic conditions which encourages nomadic pastoralism because each community is able to occupy large area of land.
6. Desert and semi-desert conditions which do not favor agriculture, making livestock rearing to be way of earning livelihood.
7. Tradition of the people whereby animals are a sign of wealth and are used for paying dowry and slaughtered for festivals.

➡ **Characteristics of nomadic pastoralism.**

1. The animals are grazed communally.
2. The animals are kept for subsistence (meat and milk)
3. Nomadic herders make use of natural pasture for grazing of their livestock.
4. Normally practiced areas with low and unreliable rainfall.
5. The movements of the pastoralists are determined by the availability of water and pasture.
6. Different types of animals are kept.
7. A man's social position and prestige depends upon the size of his herds.

➡ **Problems facing pastoral community in Somaliland**

1. Climatic problems.
2. Pest and disease attack.
3. Lack of veterinary services.
4. Lack of transport.
5. Lack of knowledge
6. Overstocking
7. Lack of market information.
8. Animals are frequently attacked by wild animals

➡ **Significance of livestock rearing**

1. Animals are source of food to humans
2. Animals are source of income
3. Cultural use
4. Medium of exchange
5. Social ceremonies
6. Recreational purpose

-
1. Mohamed-Taharo
 2. Mohamoudkader
 3. Mustafe –Agro
 4. Cumar caynaan

➡ MAIN TYPES OF FIBER

1. **Plant:** cotton, jute, Manila hemp, sisalhemp.
2. **Animal:** wool, silk.

A. Plantfiber

1. Cotton

- **Cotton** is a soft, fluffy **staple fiber** that grows in a **boll**, or protective case, around the seeds of the cotton plants of the genus *Gossypium* in the mallow family **Malvaceae**. The fiber is almost pure cellulose. Under natural conditions, the cotton bolls will increase the dispersal of theseeds.
- The plant is a **shrub** native to tropical and subtropical regions around the world, including the Americas, Africa, Egypt and India. The greatest diversity of wild cotton species is found in Mexico, followed by Australia andAfrica.
- Cotton is made from the fibers of the fruit of the cottonplant.
- The fruit is like a pod and is called aboll.
- It contains black seeds which are embedded in a mass of white fibers, which is often called cotton lint.

➡ Types ofcotton

- There are four commercially grown species of cotton, all domesticated in antiquity:
 1. *Gossypium hirsutum* – upland cotton, native to **Central America**, Mexico, the Caribbean and southern Florida (90% of worldproduction)
 2. *Gossypium barbadense* – known as extra-long staple cotton, native to tropical South America (8% of world production)
 3. *Gossypium arboreum* – tree cotton, native to India and Pakistan (less than2%)
 4. *Gossypium herbaceum* – Levant cotton, native to southern Africa and the Arabian Peninsula (less than 2%)

➡ Classification of cotton fiber

- (a) **Short staple cotton:** when it is less than 3cm.
- (b) **Long staple cotton:** when it is over 3cm.

➡ Growing conditions of cotton

1. **Annual rainfall:** 500mm (about 20 in) and 1000mm (about 40 in).
2. **Growing season:** 200 days.
3. **Temperature:** 21°C (about 70°F) and the complete absence of frost.
4. **Abundant sunshine:** when flowers are forming and fruits are ripening.
5. A dry harvest season.
6. Rich, deep soils which contain a plenty of organic matter.
7. Abundant labor for picking the bolls.

➡ Cotton picking

- ✓ Cotton bolls are harvested as soon as they burst because any rain which falls after they have opened damages the fibers in the bolls. Although picking is still done by hand in many cotton regions, machine pickers are being increasingly used. But hand picking is more selective than machine picking because the bolls do not all open at the same time. In the U.S.A, a variety of cotton plant has been developed, all the bolls of which are open at the same time.

➡ Treatment of the lint

- ✓ The fibers in the bolls are called lint, and this has to be separated from the cotton seed.
- ✓ The process by which this is done is known as ginning and it takes place in a machine called a **gin**.
- ✓ This lint is then packed into bales and sent to factories where the lint is spun into a continuous thread called **yarn**.

➡ **Cotton production and worldtrade**

- ✓ The **U.S.A.**, the **C.I.S.**, **China**, and **India** are the **four largest** producers of cotton in the world, but of these only the U.S.A. and C.I.S. are important exporters.
- ✓ China and India required most of their cotton production for their homemarkets.
- ✓ Egypt, Mexico and Brazil, though relatively **small cotton producers**, are major cotton exporters.

➡ **Leading producer countries**

Top 10 cotton producing countries (in 1000 metric tonnes)		
Rank	Country	2019
1	India	5,770
2	U.S.A	3,999
3	China	3,500
4	Brazil	2,787
5	Pakistan	1,655
6	Turkey	806
7	Uzbekistan	713
8	Australia	479
9	Turkmenistan	198
10	Burkina Faso	185

Source: UN Food & Agriculture Organization

2. SISAL

- ✓ **Sisal** with the botanical *Agave sisalana*, is a species of *Agave* native to southern Mexico but widely cultivated and naturalized in many other countries. It yields a stiff fibre used in making various products. The term sisal may refer either to the plant's common name or the fibre, depending on the context.
- ✓ It is a tropical plant whose fibers are used for making string, rope and a coarse cloth used for matting.
- ✓ The plant is low shrub whose short thick stem arises a mass of long, sword-shaped leaves whose thorned edges are very sharp.
- ✓ The plant is grown from suckers in a nursery until it is about 30 cm high. It is then transplanted into plantations.
- ✓ The sisal fibre is traditionally used for rope and twine, and has many other uses, including paper, cloth, footwear, hats, bags, carpets, and dartboards.

➡ Sisal growing conditions

1. **Temperature:** average monthly over 24°C (about 75°F)
2. **Annual rainfall:** about 890mm (35 in)
3. Abundant supply of cheap labor
4. Fertile, well-drained soil

➡ Cutting and processing

- ✓ The fibers of the sisal are contained in the leaves.
- ✓ This means that the plant, which is a perennial, does not have to be cut down.
- ✓ The plant is evergreen, and a few leaves can be cut from it, two or three times a year, for as long as twenty years.
- ✓ They are scraped and crushed by machines so that their fibers can be extracted.
- ✓ These are then washed, dried and graded.

➡ **Sisal regions and trade**

- ✓ The most extensive sisal regions are in east Africa where there are sisal plantations in Tanzania, Kenya, Uganda, Angola and Mozambique.
- ✓ Sisal originated in Yucatan, which is part of Mexico.
- ✓ The bulk of sisal fibers are exported to Great Britain, Western Europe and the U.S.A.

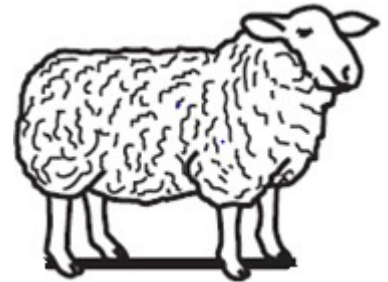
B. ANIMAL FIBER

- 1) Wool.
- 2) Silk

➡ Sheep wool can be **divided** into **three**.

1. Merino wool

- ✓ This has a long, fine strong fiber and it is extensively used for making cloth.
- ✓ This type of wool comes from merino sheep which are reared in many countries, but especially in Spain.



2. Crossbred wool

- ✓ This type of wool has a shorter fiber and it is not as good as merino wool.
- ✓ It comes from crossbred sheep which are reared for both meat and wool.

3. Carpet wool

- ✓ This wool is coarse and it has a short fiber.
- ✓ It is used mainly in the manufacture of carpets and it comes as a by-product from sheep reared for meat.

➡ Global wool production

1. **Australia:** 25% of global wool-clip (475 million kilograms [1,000 million pounds] greasy, 2004–2005)
2. **China:** 18%
3. **United States:** 17%
4. **New Zealand:** 11%
5. **Argentina:** 3%
6. **Turkey:** 2%
7. **Iran:** 2%
8. **United Kingdom:** 2%
9. **India:** 2%
10. **Sudan:** 2%
11. **South Africa:** 1%

2) SILK

- ✓ **Sericulture**, or **silk farming**, is the cultivation of **silkworms** to produce **silk**. Although there are several commercial species of silkworms, *Bombyx mori* (the caterpillar of the domestic silkworm) is the most widely used and intensively studied silkworm. Silk was believed to have first been produced in China. Sericulture has become an important **cottage industry** in countries such as **Brazil, China, France, India, Italy, Japan, Korea, and Russia**. Today, **China** and **India** are the two main producers, with more than 60% of the world's annual production.
- ✓ Silk is a fiber which is made by a caterpillar often referred to as a **silkworm**.
- ✓ During the chrysalis stage of its lifecycle, the caterpillar extrudes a fine thread in which it encases itself to form a **cocoon**.
- ✓ The filament may be as long as one mile.
- ✓ It is this filament which is spun into thread.
- ✓ Silkworms are fed on the leaves of the mulberry trees and **silkworm farming**, which is called **sericulture**, is confined to regions where mulberry grows well.

➡ The preparation of silk

- ✓ The first task is to unwind each cocoon.
- ✓ This is sometimes done by hand and sometimes by machine in factories.
- ✓ Each cocoon yields about 450 m of good quality thread which comes off first, and from 450 m to 1350 m of poorer quality thread which comes off last.
- ✓ The latter is spun into a weaker thread which is called spun silk

➡ Silk regions and trade

- ✓ **China** and **Japan** are the main silk-producing countries of the world.
- ✓ The **chief silk exporters** are **Japan, Italy, China** and **Thailand**.
- ✓ The U.S.A. and the countries of north-west Europe are leading importers.

➡ FARM TOOLS AND EQUIPMENTS

- Farm tools and equipment are devices used to carry out certain activities on the farm.

➡ They are categorized into five major groups namely.

1. Garden tools and equipment.
2. Livestock production tools and equipment.
3. Workshop tool and equipment.
4. Plumbing tools and equipment.
5. Masonry tools and equipment.

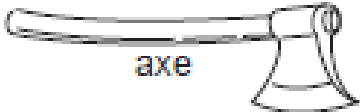
➡ Reasons for using farm tools and equipment.

1. To increase efficiency on the farm.
2. To enhance production.
3. To enhance safety on the farm.

➡ Precautions taken when using farm tools and equipment

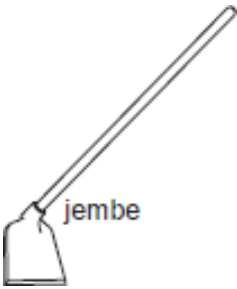
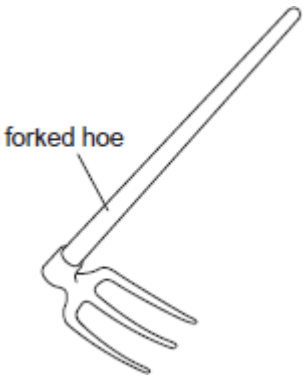
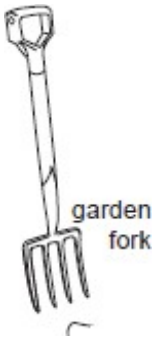
1. Handle tools carefully and correctly.
2. Use a tool for a job it was designed for.
3. Maintain the tool in good working condition.
4. Learn how to use a tool or operate equipment before using it.
5. Dress appropriately when using farm tools and equipment.
6. The work should be firmly secured where possible.
7. Store farm tools in safe place such as in tool racks.
8. Avoid wearing loose clothes especially when operating workshop tools and equipment.
9. Avoid working on dangerous grounds such as on slippery floors.

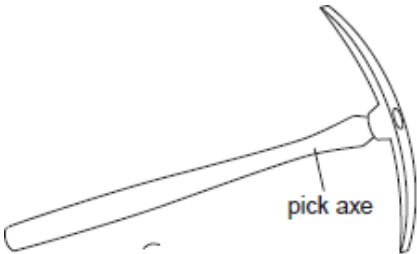
1. Garden tools and equipment

Tool or equipment	Uses	Care and maintenance
Axe 	• Felling big trees • Cutting tree stumps • Splitting firewood.	• Sharpen the cutting edge. • Repair broken handle • Keep the cutting edge dry and oiled to avoid rusting. • Avoid hitting stones or metals with the edge.
Panga or machete 	• Clearing land with small trees and shrubs. • Shallow cultivation • Harvesting crops.	• Sharpen the cutting edge if blunt • Store properly after use • Oil for long storage to prevent rust. • Repair or replace the handle if broken.

-
- 1.Mohamed-Taharo
 2. Mohamoudkader
 3. Mustafe –Agro
 4. Cumar caynaan

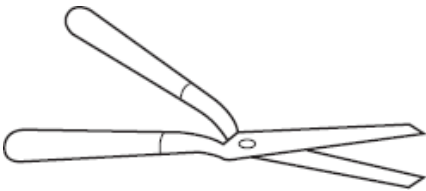
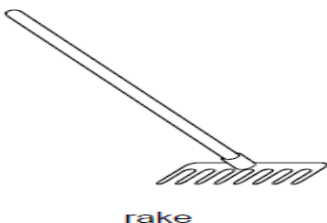
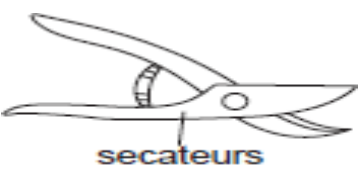
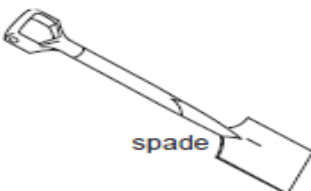
Page

Jembe or hoe 	• Seedbed preparation • Planting • Weeding • Harvesting of rootcrops.	• Clean and dry it after use • Keep the blade oiled to prevent rusting • Sharpen the blade if blunt and flatten hammering if dented • Replace the handle if broken • Keep the handle firmly fixed.
forked jembe or forked hoe 	• Weeding rhizomatous weeds • Opening virginland • Cultivating stony grounds • Digging sticky soils.	• Clean and dry it after use • Replace the handle if broken • Straighten prongs by hammering if bent • Oil prongs to prevent rusting • Keep the handle firmly fixed • Weld broken prongs.
Garden fork 	• Digging stony grounds where the spade is not effective • Weeding nursery bed • Transplanting seedlings • Collecting manure on the farm.	• Clean and dry after use • Oil metallic parts to prevent rusting • Weld broken prongs and replace the handle if broken.

Garden trowel 	• Lifting seedlings during transplanting • Making holes for transplanting • Loosening soil in the nurserybed.	• Clean and dry after use • Oil the blade to prevent rusting • Replace the handle if broken.
Hose pipe 	• Conveying water from a tap to where it is needed.	• Repair any leakage • Clean after use • Do not keep in the sun • Use clean water.
Mattock or pickaxe 	• Digging and removing large stones • Digging or breaking hard soil • Uprooting stumps.	• Replace the broken handle • Clean and keep it dry after use • Oil the metal part to prevent rusting.
Pruning hook 	• Cutting or removing unwanted or infected branches of fruit trees • Harvesting fruits from trees.	• Sharpen regularly • Replace the broken handle • Oil metallic part to prevent rusting
Pruning saw 	• Removing of extra unwanted branches.	• Oil to prevent rusting • Replace the broken handle • Sharpen the teeth if blunt

-
- 1.Mohamed-Taharo
 2. Mohamoudkader
 3. Mustafe –Agro
 4. Cumar caynaan

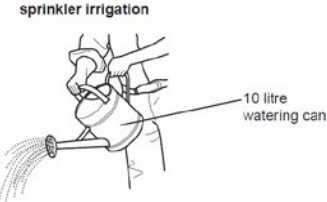
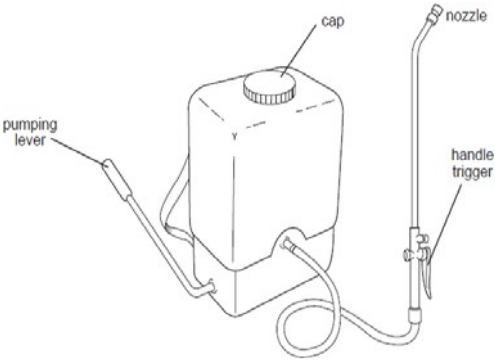
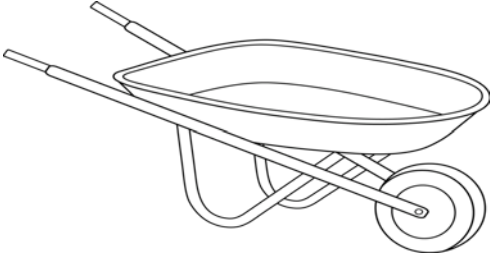
Page

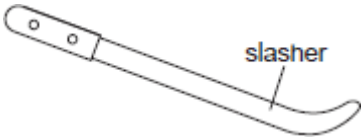
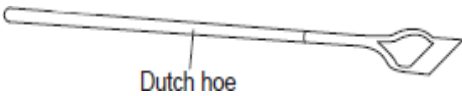
Pruning knife 	• Cutting small unwanted branches of fruit trees.	• Oil to prevent rusting • Replace the broken handle • Sharpen the teeth if blunt.
Pruning shears or garden shears 	• trimming hedges • Cutting grass near fences.	• Oil the pivot • Sharpen the edges if blunt • Replace the broken handle
Rake  rake	• Collecting trash • Breaking up soil clods • Leveling nursery beds and seedbeds • Uprooting weeds • Mixing fertilizers with soil.	• Clean after use • Replace the broken handle • Weld broken prongs.
Secateurs  secateurs	• Pruning tree crops • Harvesting flowers • Cutting vegetative materials for planting.	• Sharpen the cutting edges • Lubricate the pivot • Oil to prevent rusting.
Spade  spade	• Removing of soil when constructing farm • Mixing sand, cement, and gravel in farm building construction.	• Keep the handle firmly fixed • Clean and dry after use • Replace the broken handle.



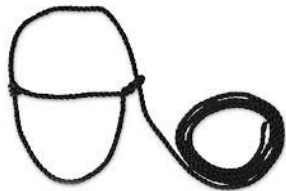
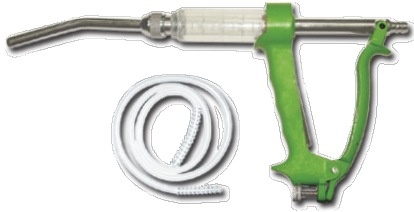
- 1.Mohamed-Taharo
2. Mohamoudkader
3. Mustafe –Agro
4. Cumar caynaan

Page

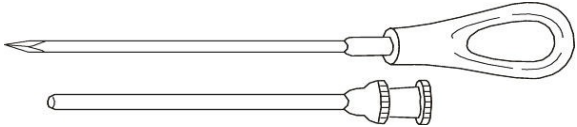
Watering can 	Used to water plants by hand. 	- Paint to prevent rusting - Always keep it empty and dry.
Knapsack sprayer 	- Spraying agricultural chemicals to crops in order to control pests and diseases - Spraying livestock to control external parasites.	- Wash and clean after use - Replace or repair worn out parts - Grease movable parts - Tighten any loose parts - Unblock nozzles that are blocked.
Wheelbarrow 	Transporting small loads of inputs and farm products on the farm.	- Grease moving parts - Replace or repair broken parts - Clean after use
Spring balance	Weighing products of small masses.	- Keep it clean and dry to avoid rusting - Avoid weighing heavy products beyond recommended weight.

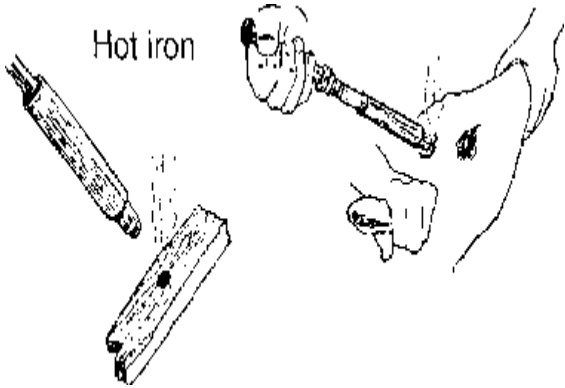
Sprinkler	Irrigating crops.	- Oil and grease moving parts - Replace broken parts.
Sickle	- Harvesting cereals. - Cutting grass.	- Sharpen cutting edges - Replace broken handle - Store in a tool rack to avoid injuries.
Slasher 	- used for cutting grass - Slashing crop residue once the main crop has been harvested from a field. - Used to clear scrub.	- Sharpen cutting edges - Replace broken handle - Oil to prevent rusting.
 Dutch hoe	- used to shape soil - remove weeds, - clear soil, - harvest root crops.	- Replace broken handle - Oil to prevent rusting.

2. Livestock production tools and equipment

Tool or equipment	Uses	Care and maintenance
Bull ring or nose ring and lead stick 	- Restraining large livestock animals - Control movement of the animal.	- Replace the ring if broken - Use a sizeable strong stick - Keep the stick dry.
Halter 	It is a special rope designed for restraining and leading animals.	Keep it dry especially if made of sisal.
Bolus gun	Administering solid drugs to animals through the mouth.	- Clean after use - Store in a cool dry place.
Drenching gun or dosing gun 	Administering liquid drugs into the mouth of an animal.	- Wash and disinfect after use - Repair broken parts - Tighten loose parts - Unblock nozzle if blocked.

Burdizzo 	• Bloodless castration of male livestock • Docking sheep. 	• Oil the pivot • Replace the handle if broken • Tighten loose parts.
Elastrator 	• Expanding the rubber ring when fixing it for castrating, docking and dehorning of animals.	• Oil the pivot • Tighten loose parts • Repair any broken handle.
Ear notcher 	• It is used for ear notching the edge of the ear for identification purposes in livestock.	• Clean and disinfect after use • Oil and grease the movable parts • Repair any broken parts.
Hoof trimmer or hoof cutter 	• Cutting overgrown hooves of livestock. 	• Oil the pivot • Sharpen the cutting edges • Keep dry to prevent rusting.

Teeth clipper or teeth nipper 	Used for cutting milk teeth to prevent injury to mother's teats.	- Oil or grease movable parts - Clean and disinfect after use.
Trocar and cannula 	Used for surgical treatment of bloat in animals.	- Clean and sterilize after use - Store in a safe place.
Wool shears 	Used for shearing, cutting, or clipping wool in sheep.	- Sharpen the cutting edges - Oil to prevent rusting - Clean after use.
Hypodermic needle 	- Administering drugs by injection - To extract blood samples from an animal for diagnosis.	- Use the appropriate needle for a given animal - Sterilize after use by boiling in water.
Milking churn or milking can 	Holding milk in transit.	- Wash with hot water and a detergent after use - Store in a clean dry place.

Milk strainer or milk sieve 	• Straining milk so as to remove hair or dirt that collects in milk during the milking process.	• Clean after use • Keep it dry • Store in a clean dry place.
Strip cup 	• Checking for or detecting mastitis in milk.	• Clean after use • Keep it dry • Store in a clean dry place.
Hot iron 	• Used for dehorning.	• Clean after use • Oil to prevent rusting
milk bucket 	• Used for Transporting milk	• Clean after use • Wash with hot water and a detergent after use • Store in a clean dry place.

REVIEW QUESTIONS.

✓ Part one: multiple choice questions.

1- Extensive farming implies all of these except.

- (a) High yield per hectare
- (b) High yield per man
- (c) Large area per farm
- (d) Small number of crop types
- (e) High income per farm

2- Which of the following statements is incorrect?

- (a) Perennial canals are superior to inundation canals.
- (b) Perennial canals contain water in the wet season only.
- (c) Tank irrigation is practiced in parts of Sri Lanka
- (d) Irrigation is used in dry farming.
- (e) Irrigation schemes are often associated with H.E.P. schemes.

3- Agriculture which involves the haphazard cutting and burning of vegetation, is part of

- (a) Nomadic farming
- (b) Dry farming
- (c) Subsistence farming
- (d) Shifting cultivation
- (e) Extensive farming

4- The only condition that dairying does not require is

- (a) Regular attention
- (b) Fertile pasture
- (c) Plenty of water
- (d) Large area of land

5- The disadvantages of nomadic animal farming to the economy of a country include

- (a) Available natural pastures are utilized
- (b) Settlements are impermanent
- (c) The people depends on their animals for food and clothes
- (d) Animals are kept in quantity and their quality is not important

- 6- Perennial irrigation differs from annual irrigation in that it
- (a) Needs less capital
 - (b) Is seasonal
 - (c) Covers the area with fertile silt
 - (d) Involves a large area in each scheme
- 7- Which of the following is not a characteristic of both the fenlands of eastern England, and the Netherlands?
- (a) The land is flat and low-lying
 - (b) Drainage canals are often several meters higher than the surrounding farmland
 - (c) Windmills are often used to operate irrigation works
 - (d) The land is intensively cultivated
- 8- Shifting cultivation is known by all of the following names except.
- (a) Ladang
 - (b) Taungya
 - (c) Transhumance
 - (d) Milpa
- 9- *Truck farming* is carried on extensively in many parts of the U.S.A. another name for *truck farming* is
- (a) Sericulture
 - (b) Market gardening
 - (c) Horticulture
 - (d) Fruit farming
- 10- Intensive agriculture is associated with all of the following except.
- (a) Vegetable farming in the Netherlands
 - (b) Rice farming in the lowlands of south-east Asia
 - (c) Fruit farming in California
 - (d) Wheat farming in Canada
- 11- In which of the following regions is nomadic animal farming not a major activity?
- (a) Northern Scandinavia
 - (b) South-east Australia
 - (c) The arid steppes of central Asia
 - (d) Parts of east Africa, especially Sudan

12- The successful large scale cultivation of wheat requires all of the following except.

- (a) Plenty of farming machinery
- (b) Growing season temperatures of about 15°C and 21°C
- (c) An annual rainfall of about 400mm to 900mm
- (d) A warm, dry sunny season for ripening the grain
- (e) Good transport and storage facilities

13- The conditions that best favour the cultivation of rice are

- (a) Flat land and heavy rainfall (at least 2000 mm per year)
- (b) Heavy soils and a hot climate
- (c) Flooded (or irrigated) land and high annual temperatures (at least 21°C)
- (d) A high density of population

14- Which of the following statements is incorrect?

- (a) China is the world's largest producer and exporter of rice
- (b) Burma is one of the smaller rice-producing countries in Asia
- (c) Most of the rice grown in Asia is not consumed by countries that grow
- (d) Asian countries grow sufficient rice to meet their requirements
- (e) More rice grown in Thailand than Indonesia

15- Extensive wheat farming in temperate continental latitudes is characterized by

- (a) A large labour force
- (b) A high yield per man
- (c) A high yield per unit area of land
- (d) Small farms

16- The main cereal growing in Africa is

- (a) Rice
- (b) Millet
- (c) Oats
- (d) Barley

17- Which of the following is not a necessary for the cultivation of rice?

- (a) A large labour force
- (b) A high rainfall or abundant irrigation water
- (c) A fast transportation to market
- (d) Flat land or terraced land

18- In which way does wheat farming resembles ricefarming?

- (a) It takes places in temperatelatitudes
- (b) It is planted and harvested in a twelve month period
- (c) Wheat enters extensively into worldtrade
- (d) Most of the wheat is made into flour

19- One of the following crops is grown on large farms located on some of the richest soils in the world for the sole purpose of feeding it to animals. The crop is

- (a) Barley
- (b) Oats
- (c) Rye
- (d) Maize

20- The main pineapple exporting countryis

- (a) Hawaii
- (b) Malaysia
- (c) Taiwan
- (d) Indonesia
- (e) Thailand

21- Market gardening areas may produce all of the followingexcept.

- (a) Vegetables
- (b) Fruits
- (c) Flowers
- (d) Poultry
- (e) Beef

22- Which of the following is applicable to marketgardening

- (a) The use of sophisticated equipment on a small unit area ofland
- (b) The use of a small labour force on a large unit area ofland
- (c) The use of intensive labour on a small unit area ofland
- (d) The use of sophisticated equipment on a large unit area ofland
- (e) The construction of a close network of irrigation**

canals 23- Market gardening does notneed

- (a) Fertile soil
- (b) A large labourforce
- (c) Fast transport to market
- (d) Large landarea

-
- 1.Mohamed-Taharo
 2. Mohamoudkader
 3. Mustafe –Agro
 4. Cumar caynaan

Page

24- One of the conditions that is necessary for the cultivation of bananas is

- (a) High temperature and humidity
- (b) A clay soil which retains water
- (c) Strong winds which causes little damage
- (d) A cool winter for 4 to 6 months

25- Which one of the following countries is not an important grower and exporter of pineapples

- (a) Mexico
- (b) Malaysia
- (c) Hawaii
- (d) Brazil

26- Which one of the following statements about the cultivation of bananas is true?

- (a) Bananas are growing on fairly small farms in all the major banana-growing countries
- (b) Bananas are grown on large estates (called plantations) in some of the major banana-growing countries
- (c) Bananas are grown mainly as a subsistence crop in the canary island
- (d) Banana trees are growing from seedling

27- Viticulture is the name given to

- (a) The cultivation of Mediterranean fruits
- (b) The method of extracting juice from grapes
- (c) The cultivation of grape vines
- (d) The manufacture of wine

28- The pastoral communities in Somaliland move from place to another in different seasons. This movement is termed

- (a) Transhumance
- (b) migration
- (c) dry land ranching
- (d) shifting agriculture

29- Conditions favouring the growth of coffee trees include

- (a) A clay soil
- (b) Frost in the winter only
- (c) Rain only in the summer
- (d) A well-drained soil

-
- 1.Mohamed-Taharo
 2. Mohamoudkader
 3. Mustafe –Agro
 4. Cumar caynaan

Page

30- Successful cultivation of coffee requires all of the following conditions except.

- (a) Rich, deep, well-drained soils
- (b) Annual rainfall of about 1800 mm
- (c) Daily minimum temperature of 15°C
- (d) Early morning mist followed by cloudy sky
- (e) A large labour force

31- Tea and coffee are grown on hill slopes mainly because

- (a) The slopes are terraced
- (b) The temperature over the slopes is lower than over the lowland
- (c) It is difficult to grow other crops on the slopes
- (d) The slopes are well-drained
- (e) It is easier to grow these crops on slopes

32- The largest exporter of cane sugar is

- (a) India
- (b) Brazil
- (c) Cuba
- (d) China
- (e) U.S.A

33- Sugar cane producing regions include

- (a) The west India
- (b) Northern China
- (c) Western Europe
- (d) South Africa
- (e) Western Australia

34- Which one of the following statements, all of which are about sugar cane cultivation, is not essential condition?

- (a) Temperature of 25°C and rainfall of 2000 mm per year
- (b) Temperature of 25°C and fertile moist soil
- (c) It requires level land which can be irrigated
- (d) The growing season should be hot and wet, and this should be followed by a dry sunny season to enable the cane to ripen

35- Cocoa trees bear cocoa beans when they are about.

- (a) 10 years old
- (b) 5 years old
- (c) 3-5 years old
- (d) 3 years old

36- Which of the following pairs of countries is important for the cultivation of coffee and sugar cane respectively?

- (a) Brazil and Australia
- (b) Ghana and Poland
- (c) China and Brazil
- (d) Australia and Ghana

37- Which of the following plants is grown specifically for the oil that is contained in its fruits or seeds?

- (a) Soya bean plant
- (b) Oil palm
- (c) Coconut palm
- (d) Olive tree
- (e) Maize plant

38- Vegetable oils are in great demand in industrial countries because they are mainly used

- (a) In the manufacture of synthetic fiber
- (b) As a substitute of petroleum oil
- (c) For making soap and margarine
- (d) For making paint
- (e) By diesel engines

39- Conditions favouring the growth of groundnut do not include

- (a) Sandy soil
- (b) Tropical conditions
- (c) Continuous high temperature
- (d) Moderate rainfall
- (e) Shady slopes facing away from the sun

-
- 1.Mohamed-Taharo
 2. Mohamoudkader
 3. Mustafe –Agro
 4. Cumar caynaan

40- Which of the following plays an important part in the manufacture of soap?

- (a) Petroleum products
- (b) Animal fats
- (c) Soft water
- (d) Vegetable oil

41- The palm oil originates.

- (a) North America
- (b) West Africa
- (c) Europe
- (d) East Africa

42- Commercial animal farming is mainly practiced with all of the following animals except.

- (a) Dairy cows
- (b) Pigs
- (c) Sheep
- (d) Goats
- (e) Poultry

43- Which of the following statements is not true?

- (a) Sheep can be reared on poorer pasture than cattle
- (b) Wheat farmer in Australia often rears sheep
- (c) Goats often cause soil erosion in semi-arid regions
- (d) It is better to use grain, such as maize, as a foodstuff for animals than as a food for man
- (e) Most of the cattle in India are under-nourished.

44- There are more sheep in Australia than there are in any other country because

- (a) Most of Australia is too hot and too dry for crops
- (b) A large percentage of the Australian grasslands are not suitable for cattle
- (c) One of Australia's principal exports is wool
- (d) Most of the sheep are reared for wool
- (e) Most Australians eat a large amount of mutton

45- Dairy farming near to large urban settlements is located there mainly because

- (a) Of the availability of capital to finance dairyfarming
- (b) Of special food that dairy cattle need that only urban centres cansupply
- (c) There is often surplus labour in urban centres which can be employed on the farm
- (d) Of the need for a nearby market because dairy produce isperishable
- (e) Agricultural land values are higher near to urbancentres

46- Beef and dairy farming differ in that beef farmsrequire

- (a) Lesslabour
- (b) Less fertile pasture (except forfattening)
- (c) Smaller watersupply
- (d) Better transport to the centres ofpopulation

47- Pigs are kept in dairy regionsbecause

- (a) They need labour at different times of theyear
- (b) Pigs eat skimmedmilk
- (c) Both need fertile damparea
- (d) Both need fast transport to themarket

48- During the 19th century tremendous improvements were made to commercialize beef farming in South America, especially in Argentina. Which one of the following pairs of factors was largely responsible for this improvement?

- (a) Better quality cattle and improved methods of breeding were introduced from Europe
- (b) Special crops were grown for feeding to the beef cattle and refrigeration ships were introduced
- (c) Increased availability of capital and the introduction of meat packingfactories
- (d) Faster cattle ships and an increase in immigration into southAmerica

49- Although there are more beef cattle in India than in any other country, the annual production of meat is extremely low. All the following factors help to explain why this is so except.

- (a) Most of the cattle suffer from disease
- (b) Very few of the cattle are kept on farms which grow special crops to supplement the cattle's diet
- (c) Cross breeding to improve the quality of the cattle is rarely undertaken
- (d) Many Indians are too poor to buy meat

50- Which of these is not associated with silk production?

- (a) Cocoon
- (b) Sericulture
- (c) Silviculture
- (d) Silkworm

51- The world's largest producer of raw cotton is

- (a) China
- (b) Egypt
- (c) India
- (d) Mexico
- (e) C.I.S.

52- Which one of the following natural conditions would be harmful to the cultivation of cotton?

- (a) An annual rainfall of 500 mm to 1000 mm with most of it falling in the growing season.
- (b) A well-drained sandy soil
- (c) Temperatures of about 21°C during the growing season.
- (d) Clear sunny skies after the plant is full mature

53- One of the processes used in the manufacture of cotton yarn is known as ginning. This process refers to

- (a) The joining of the cotton fibers to form a continuous thread.
- (b) The separation of the seeds from the cotton fibers.
- (c) The washing of the cotton fibers.
- (d) The gathering of cotton bolls from the plant.

- 54- Which **pest** reduces both the **quality** and **quantity** of agricultural products and **transmits diseases**?
- a) Rats
 - b) Lion
 - c) Pathogen
 - d) Ringworm
- 55- Which factors affect **nomadic pastoralist** in Somaliland?
- a) Shortage of water, lack of feeds and parasites
 - b) Extensive farming
 - c) Lack of milk
 - d) More rain and humidity
- 56- Useful **machine** in the farm for **transporting loads** which are heavy is known as?
- a) Milk stool
 - b) Wheelbarrow
 - c) Rake
 - d) Watering can
- 57- Which of the following organism has a **positive effect** on crop production?
- a) Bees, bacteria and fungi
 - b) Bees and worms
 - c) Termites, Aphids and ticks
 - d) Virus, scale insects and armyworm
- 58- **Field crops** and **Horticulture crops** both are
- a) Arable farming
 - b) Intensive farming
 - c) Crop farming
 - d) Extensive farming
- 59- **Chemicals** used to **kill weeds** are known as:
- a) Sodium.
 - b) Carbon dioxide.
 - c) Herbicides.
 - d) Oxygen only.

-
- 1.Mohamed-Taharo
 2. Mohamoudkader
 3. Mustafe –Agro
 4. Cumar caynaan

Page

- 60- Which one of the following mechanism will be adapted by plants to **resist droughts**?
- a) Sending their roots deep in the ground.
 - b) Use one shaped leaves.
 - c) Developing broad leaves.
 - d) Multiplying their leaves.
- 61- The **three** common **fertilizers** used by farmers are **Nitrogen, Phosphorus** and:
- a) Sodium.
 - b) Chlorine.
 - c) Calcium.
 - d) Potassium.
- 62- The process by which plant **lose water** through their leaves is called
- a) Photosynthesis.
 - b) Respiration.
 - c) Oxidation.
 - d) Transpiration.
- 63- Which is a source of **radiant energy** required for **photosynthesis**:
- a) Light.
 - b) Carbohydrate.
 - c) Carbon.
 - d) Green pigments.
- 64- Which of the following **tools** are used for **trimming hedges** and **shrubs**?
- a) Dibber.
 - b) Trowel.
 - c) Rake.
 - d) Pruning shears
- 65- **Plantation farming** is a large scale farming characterized by the production of
- a) many different crops
 - b) one crop
 - c) Sugarcane and cotton.
 - d) Tea, coffee and oranges

66- Which of the following are **cereal crops**?

- a) Maize, mango, and bananas.
- b) Mango, papaya, citrus.
- c) Maize, millet, rice, and sorghum.
- d) Cotton, guava, and millet

67- Which one of the following is **not** a **climatic factor** that influences agriculture?

- a) Rainfall
- b) Pests
- c) Temperature
- d) Wind.

68- A farming system that requires **large tracts of land, low capital investment and labor per unit area** is known as :

- a) Extensive farming
- b) Intensive farming
- c) Plantation farming
- d) Crop farming

69- The main reasons for preparing a **seed bed** are as follows, **except**:

- a) To kill weeds
- b) To aerate the soil
- c) To encourage weed growth
- d) To encourage the penetration of roots in the soil.

70- The process of growing crops of **different families** on the **same farm** in an orderly sequence is termed as:

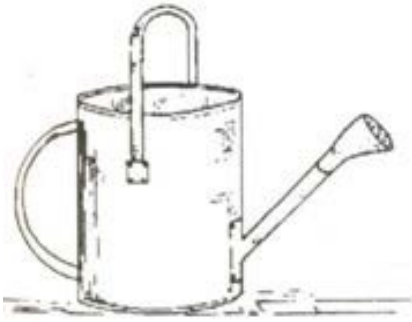
- a) Mixed cropping
- b) Monocropping
- c) Intercropping
- d) Mulching.

71- The below **farm tool** is used for **cutting trees** and it is known as:

- a) Hoe
- b) Axe
- c) Panga
- d) Spade.



72- The diagram below is one of the farm tools. It is used for?



- a) Transporting water from the source
- b) Watering animals
- c) Watering young seedlings in the nursery
- d) Watering trees in the farm

73- A farmer has a large piece of land on which he grows **wheat year after year**. What is the name for this type of agriculture?

- a) Crop rotation
- b) Mixed farming
- c) Monoculture
- d) Organic farming

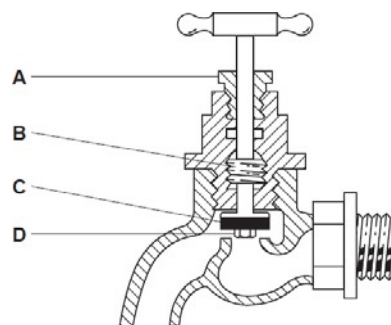
74- When should bulky **organic manure** be applied for a **cereal crop**?

- a) after planting
- b) before ploughing
- c) between harrowing and planting
- d) between ploughing and harrowing

75- What is the best way to preserve the metal parts of a tool?

- (a) Coat them with grease.
- (b) Cover them with a cloth.
- (c) Dip them in water.
- (d) Spray them with creosote.

76- The diagram shows a water tap. Which part should be replaced to stop the tap dripping?



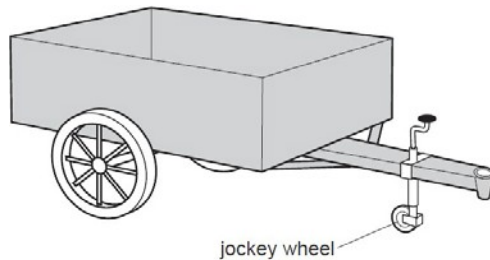
3. Mustafe-Agro

4. Cumar

77- When using a hand-held sprayer, what can be done to reduce 'spray drift'?

- (a) Apply a fine spray.
- (b) Apply spray quickly.
- (c) Apply spray under high pressure.
- (d) Apply spray under low pressure.

78- The diagram shows a farm trailer with a jockey wheel that can be lowered or raised.



79- What is the purpose of the jockey wheel on this trailer?

- (a) It allows more weight to be carried in the front of the trailer.
- (b) It allows the trailer to be towed more quickly.
- (c) It helps the trailer to brake when it is stopping.
- (d) It is used to stop the trailer from tipping forward when unhitched.

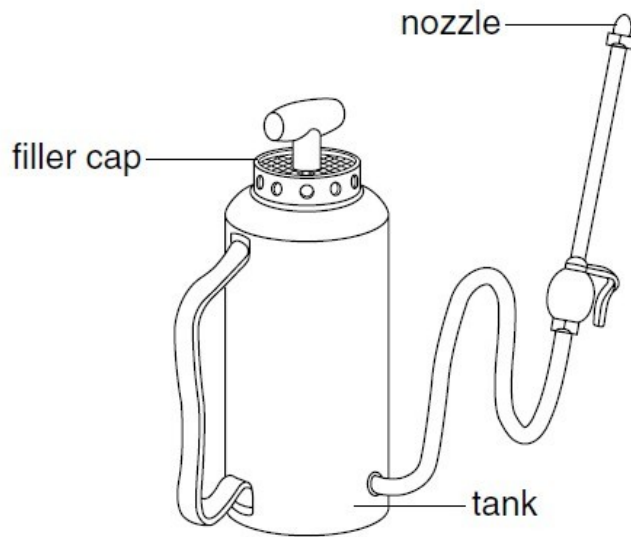
80- Why should hand tools be oiled after use?

- (a) To make cleaning unnecessary
- (b) To make rusting less likely
- (c) To make them easier to use
- (d) To make them sharper

81- How does lubricating oil help mechanical devices to work efficiently?

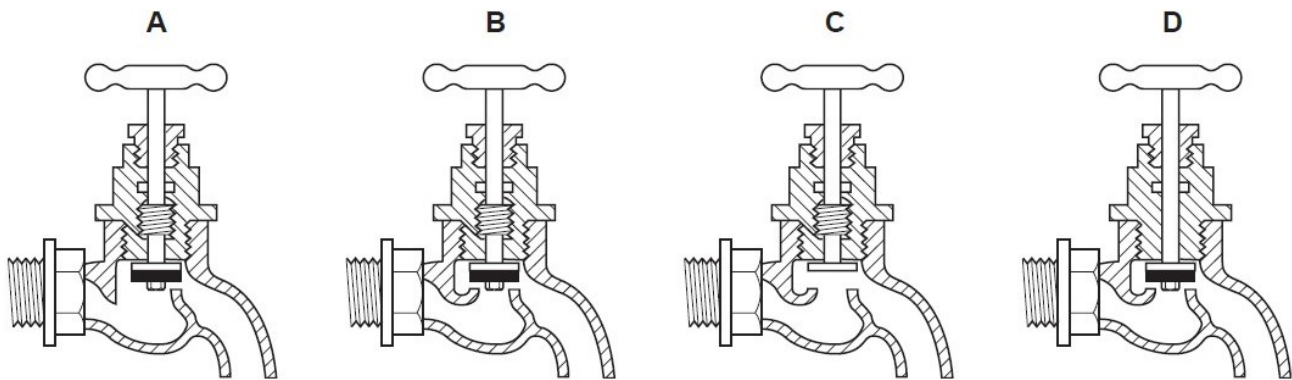
- (a) by keeping joints strong
- (b) by preventing rust forming
- (c) by preventing wood rotting
- (d) by reducing friction

82- The diagram shows a sprayer. What should be done after using the sprayer?

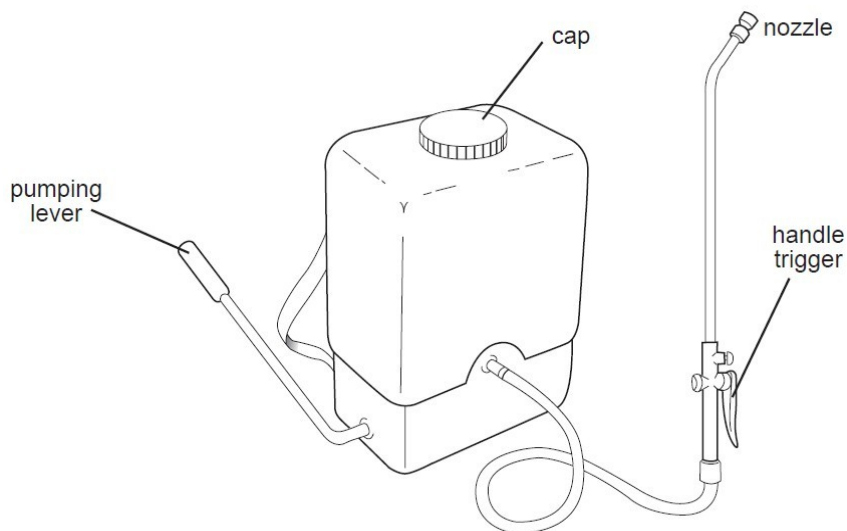


- (a) clear the nozzle by blowing through it
- (b) oil the filler cap
- (c) rinse out the sprayer tank in a stream
- (d) wash your hands thoroughly

83- Which diagram shows a tap that would work correctly?



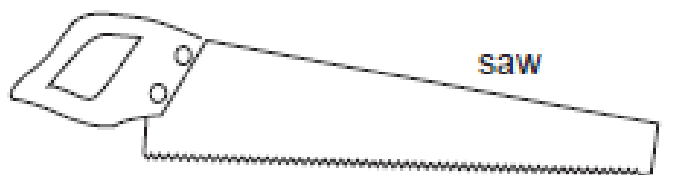
84- The diagram below shows a sprayer.



85- During use the spray ceases to flow from the nozzle. What should be the first action by the operator?

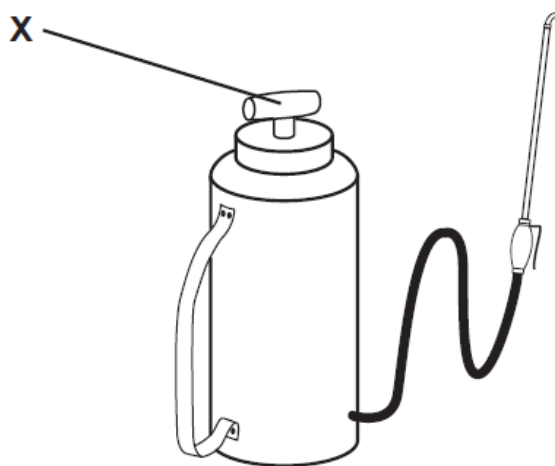
- (a) pump the lever
- (b) release the trigger
- (c) remove the nozzle
- (d) unscrew the cap

86- The teeth of a saw used to cut wood are set at an angle to the blade. Why are the teeth set at an angle and not in line with the blade?



- (a) so that the saw can bite into the wood as it cuts
- (b) so that the saw can make a groove in the wood to pass through
- (c) so that the saw does not make too much noise
- (d) so that the teeth push the sawdust out of the cut

87- The diagram shows a sprayer used to spray plants with insecticide.



88- What happens when the handle X is moved up and down?

- (a) The insecticide is mixed with water.
- (b) The pressure builds up in the tank.
- (c) The nozzle opens so spray can come out.
- (d) The size of the droplets in the spray is controlled.

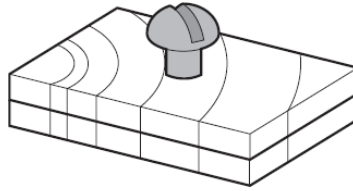
89- The diagram below shows **top dressing of maize crop** that is grown for food.



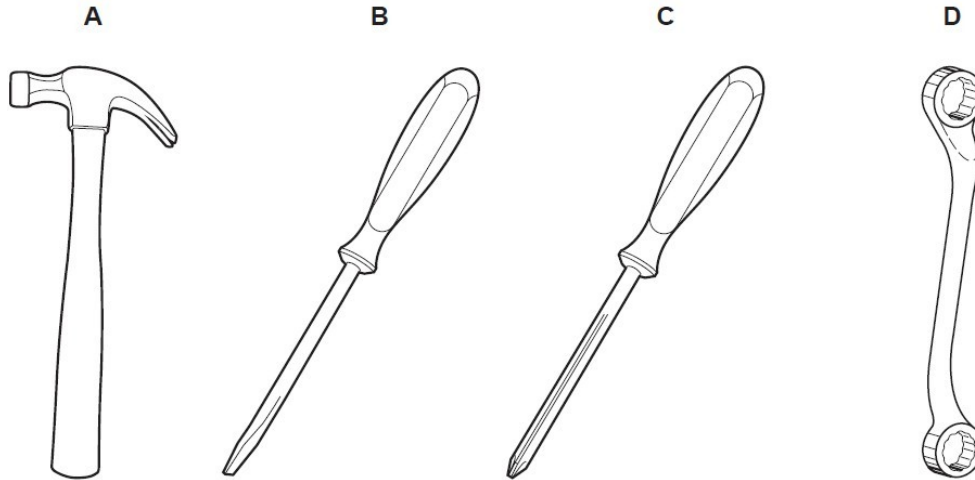
90- Which **fertilizer** is used as **top dressing**?

- (a) Phosphate fertilizers
- (b) Potassic fertilizers
- (c) Nitrogenous fertilizers
- (d) Manures

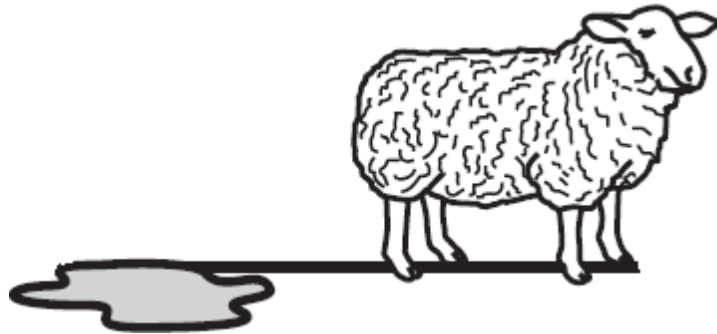
91- The diagram shows a screw fixing two pieces of wood together.



Which tool should be used to remove this screw?



92- The diagram below shows a **sheep** that releases **waste product** into the soil.



✓ Which statement **best describes** the **waste product** from the sheep.

- a) It pollutes the land.
- b) It adds organic matter into the soil.
- c) It causes diseases to the people.
- d) It adds water to the soil.

93- What is the best way to preserve the **metal parts** of a tool?

- a) Coat them with grease.
- b) Cover them with a cloth.
- c) Dip them in water.
- d) Spray them with creosote.

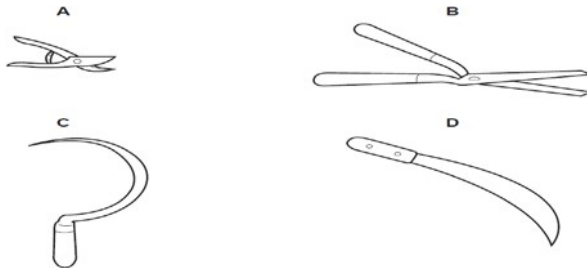
94- Why should hand tools be **oiled** after use?

- a) to make cleaning unnecessary
- b) to make rusting less likely
- c) to make them easier to use
- d) to make them sharper

95- How does **lubricating oil** help mechanical devices to work efficiently?

- a) by keeping joints strong
- b) by preventing rust forming
- c) by preventing wood rotting
- d) by reducing friction

96- Which tool is used for **harvesting sorghum, maize and grass**?



97- A **cereal crop** shows **stunted growth** and **produces small grains**. What is the most likely **cause**?

- a) bird damage
- b) early sowing
- c) poor seedbed
- d) too much fertilizer

98- Which of the following is an **agent of soil erosion**?

- a) Landscape
- b) Silt drums
- c) Sand soil
- d) Water, wind and human beings

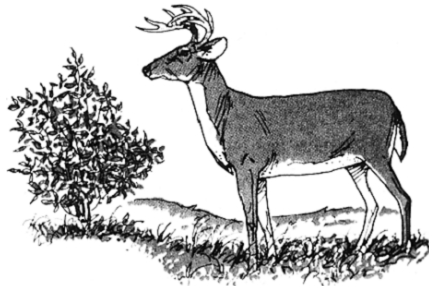
99-A young tree is planted in a **hot, dry** climate of **Barbara**. What will **reduce transpiration**?

- a) Adding fertiliser to the soil
- b) Making a hollow for watering
- c) Placing organic matter around the tree
- d) Removing some of the leafy shoots

100- Which is part of a bean flower?



101- The diagram below shows a deer and green plants.



✓ Which statement best describes the relationship between the deer and the plants?

- (a) The deer supplies food and oxygen to the green plants
- (b) The deer supplies food and carbon dioxide to the green plants.
- (c) The green plants supply food and carbon dioxide to the deer
- (d) The green plants supply food and oxygen to the deer.

➡ **Part two: answer all the questions in the space provided.** 1-

What is **agriculture**

2- Explain how the following factors **influence** agriculture.

(a) Temperature

(b) Soils

(c) Government policy

3- Define **shifting cultivation**

(a) Outline **features** of shifting cultivation

4- What is **intensive subsistence agriculture**

(a) What is **extensive** graincultivation

(b) Describe the **characteristics** of **extensive** grain cultivation.

(c) Explain how the following factors affect **plantationfarming**

I. Pricefluctuation

II. Competition

III. Inadequateland

IV. Inadequatecapital

5- What is **arable**farming

6- Apart from **tea**, name **another** crops grown on largescale.

- 7- State **three** physical and **three** human requirements that are necessary for the growing of tea.

- 8- Explain **five** problems experienced in **small scale** tea farming.

- 9- The table below shows tea **production** for the years **2013** and **2016**.

year	Tea production in tonnes
2013	146000
2016	181000

- (a) Calculate the **percentage** increase in tea production over the four year period.

- (b) Give **two** reasons that may have contributed to the increase in tea production in the given period.

(c) Describe how the following activities are carried out in teafarming

I. Picking oftea

II. Processing oftea

10- State **five** physical conditions that are necessary for the growing of sugarcane.

11- Describe the **physical** requirement for growing **maize** inSomaliland

(a) Explain the **problems** facing maize farming inSomaliland

(b) Explain how maize contributes to the **economy** of **Somaliland**

12- State **four** physical factors that favor coffee growing in Kenya and brazil

13- Explain **four** physical conditions that favor wheat growing in Somaliland

(a) Explain the factors which enable **Canada** to produce more wheat than **Somaliland**.

14- What is **horticulture**

(a) Describe the **characteristics** of horticultural farming in **Somaliland**

- (b) Horticulture is more developed in the Netherlands than in Somaliland.'Give **five reasons** for this.

- (c) State **four** ways in which Somaliland has benefited from horticulture farming

- (d) State **four** problems facing horticultural farming in Somaliland.

15-What is livestock farming?

- (a) Describe the following types of livestock farming practices in **Somaliland**

I. Pastoral farming

II. Beef cattle farming

16- What is nomadic pastoralism

(a) Describe the **characteristics** of nomadic pastoralism in **Somaliland**.

17- What is **beef** cattle farming

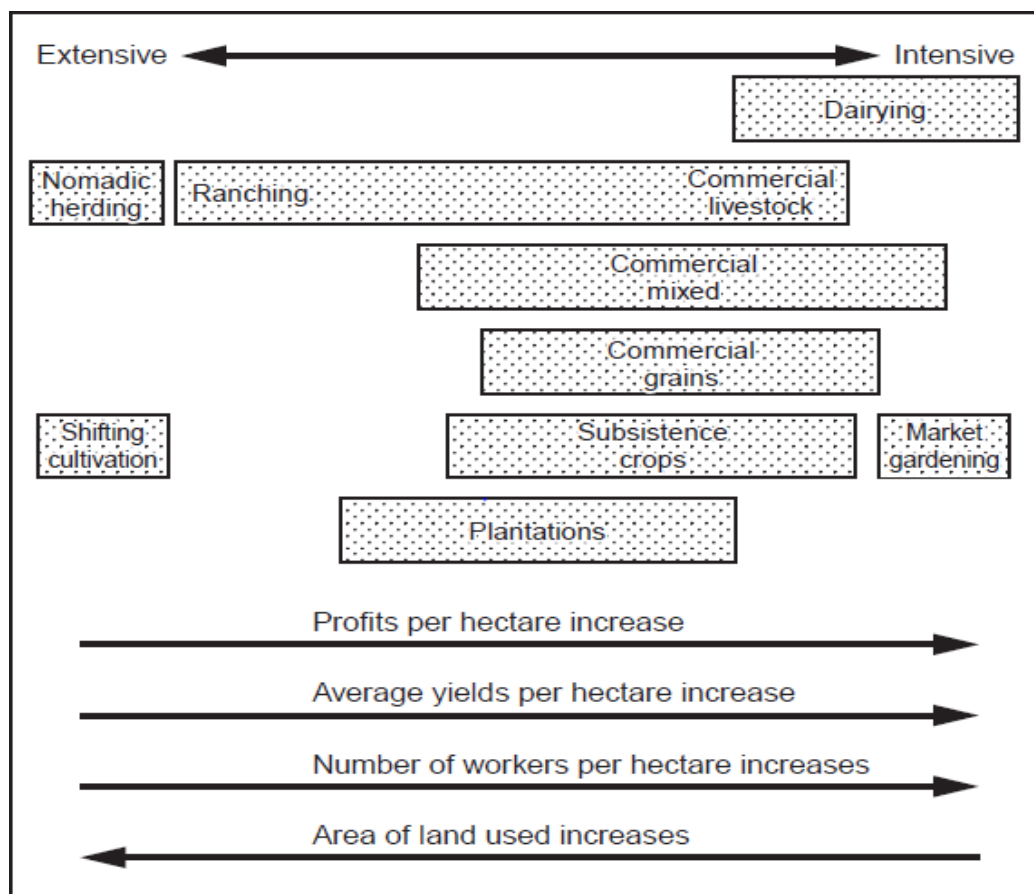
(a) State how commercial beef cattle farming contribute to the economy of **Somaliland**.

18- State **two** factors that cause most farmers to adopt small-scale farming in **Somaliland**.

19- Give **four** reasons why nomadic Pastoralism is discouraged in **Somaliland** today.

20- Why **dark** colour is important in soils?

21- The diagram below shows information about different farmingsystems.



1. Give **one** example of an extensive farming system which is shown on the above diagram. _____

(a) What is meant by the terms:

i- subsistence farming _____

ii- Commercial farming? _____

(b) Identify the following types of farming **A**, **B** and **C**. You should use only the farming systems named in the boxes in the diagram above.

A. The growing of fruits, vegetables and salad crops on small scale intensive farms.

B. A system of **monoculture** in tropical areas, using large areas of land.

C. The farmer **moves** every few years to another plot to grow crops such as pineapple.

22- The diagram below shows **mixed farming**.



(a) State **three** advantages of mixed farming showing in the diagram.

23- State **two** ways by which **wind** affects the growth of crops?

24- Give **two** reasons for **sowing** annual crops **early in the planting season**?

25- Which **disease** causes a **mass of dark spores** on the flowering parts of maize?

26- **Gardeners** often collect **fallen leaves** in autumn and place them on compost heaps.



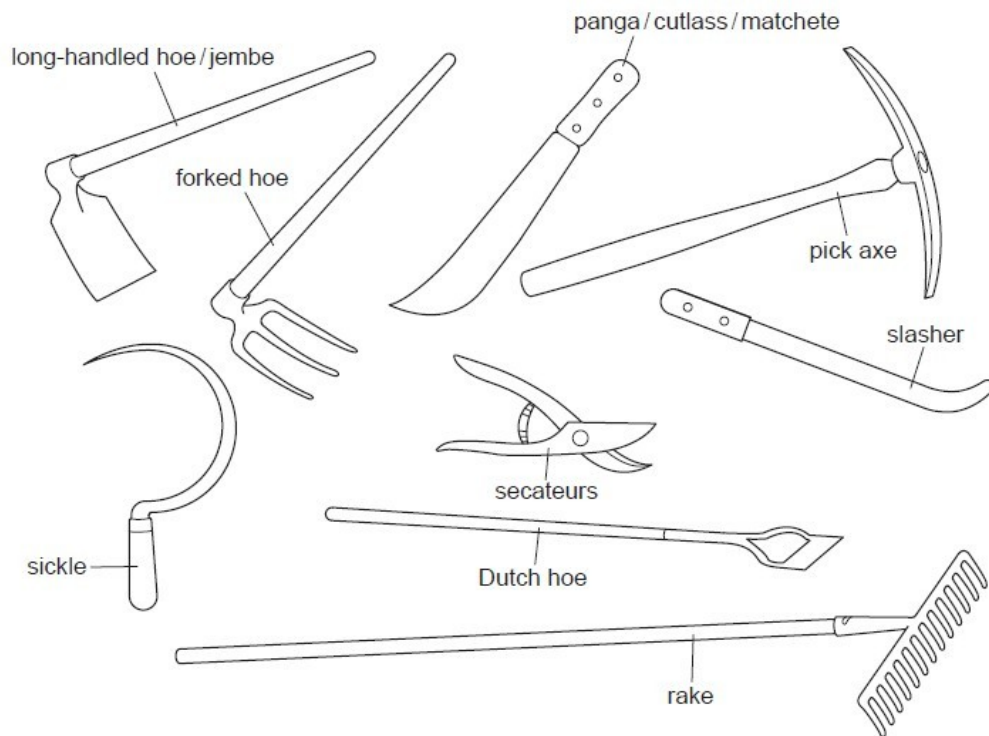
(a) The **next year** the leaves **decay**. Which living things cause **leaves** to **decay**?

(b) The leaves decay more quickly in **summer** than in **winter**. Give **one** reason why?

(c) The compost heap has holes in its sides to allow gases to enter. Which **gas** is needed for decay?

27- Explain how **biotic** factors affect crop production both negatively and positively.

28- State **two** ways in which cultural practices and religious beliefs can affect agriculture negatively.

29- The diagram below shows hand tools used in agriculture.

(a) Which is used for harvesting of **cereals**?

(b) Which tool is used for **leveling** seedbed?

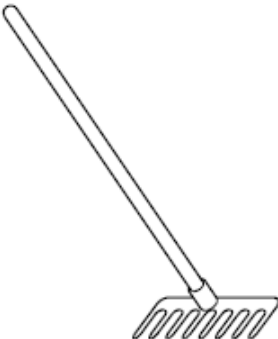
(c) Which tool is used for digging **stony** ground?

(d) Which tool is used for pruning of **soft** branches?

(e) Which tool is used for **preparing** seedbed?

(f) Which tool is used for removing **stones** and **stumps**?

30- The diagram below shows three hand tools. **Complete it.**

 spade	 fork	 rake
function of the spade 	function of the fork 	function of the rake

31- Give **three** reasons for using farm tools and equipment.

.....

.....

.....

32- State **five** reasons for maintaining farm tools and equipment.

.....

.....

.....

.....

.....

33- Give **four** safety practices that should be taken when using farm tools.

34- The diagram below shows a farm tool used for cultivation.



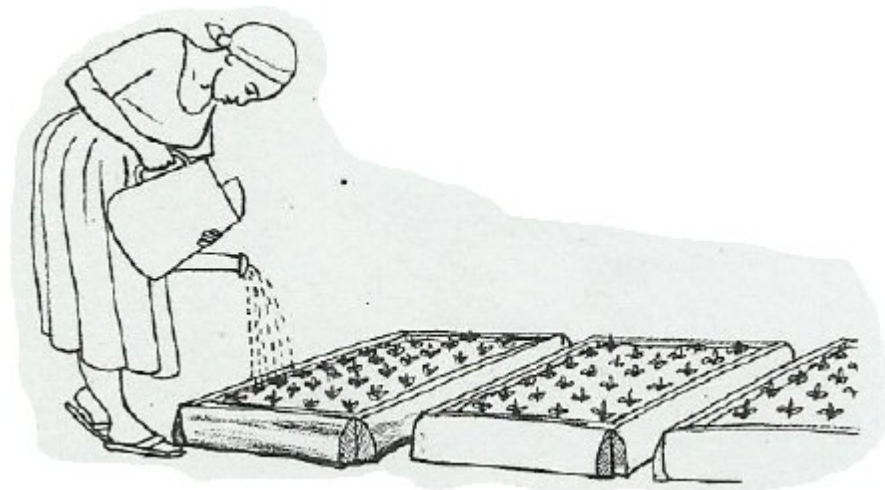
(a) **Name** the tool used in the activity above.

(b) How can the handle of the above tool be tightened in case it gets loose?

(c) State **four** maintenance of the above tool.

(d) Give **four** precautions that should be taken when using farm tools.

35- The diagram below shows a tool which is used in the farm activity.



(a) Identify the equipment.

(b) State the **function** of the tool.

(c) State **four** maintenance of the tool.

36- Study the diagram on the right and answer its questions.

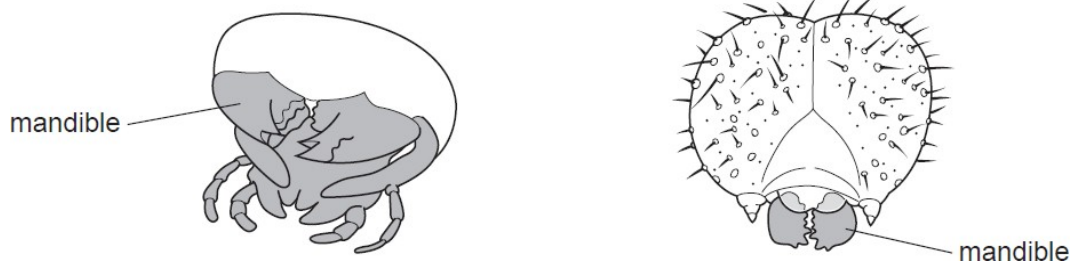
(a) **Name** the tool used.

(b) Name this special use of the tool shown on the diagram.

(c) State **three** maintenance of the tool.



37-The diagram below shows the mouthparts of two insects which feed by biting and chewing.



(a) Explain **how** insects like these **damage** crops and **reduce** yield.

(b) Suggest a way to **control** these insects in the field.

38- Give **four** reasons why **waterlogged** soil is unsuitable for most crops.

39- How can the following affect the growth of crops?

(a) Windy conditions.

(b) Low temperatures.
