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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 exert 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, Euphorbia and Xanthium.

- **Day neutral plants:** Tomato, most fruit crops, Pepper, Cucumber

➧ **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)** Wider spacing

c) 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.

d) 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 influences 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 case.
- 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 the 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.

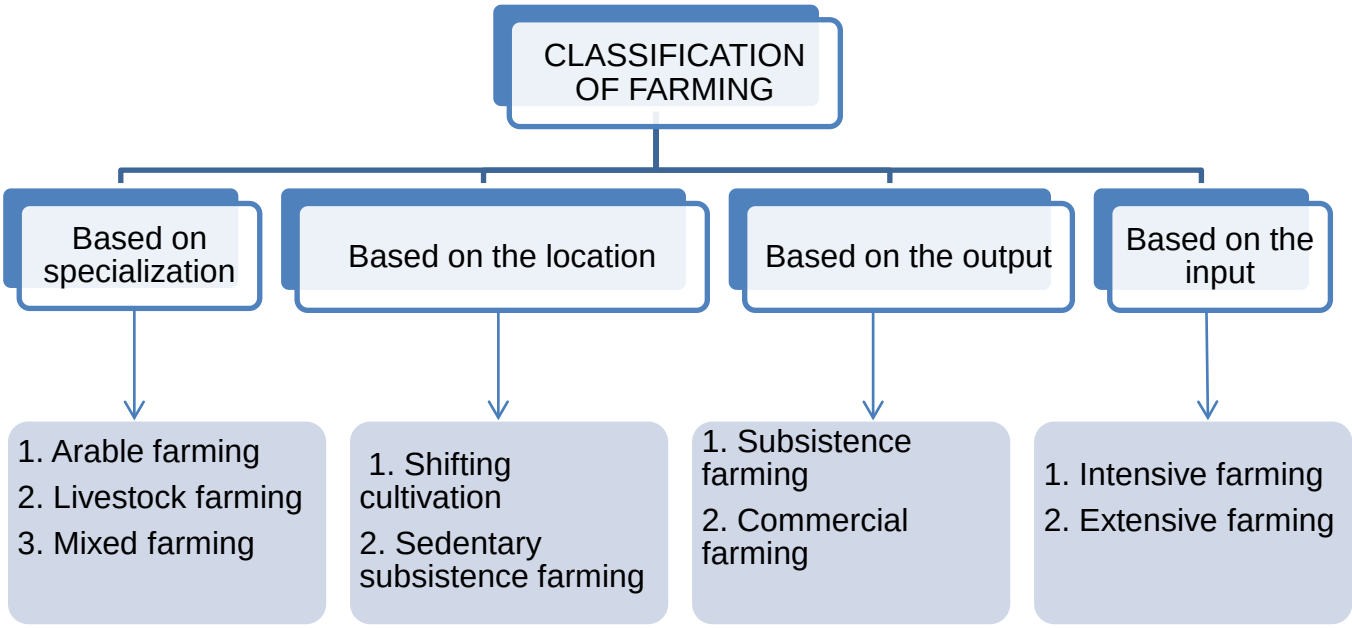
Government policies that affects agriculture negatively include

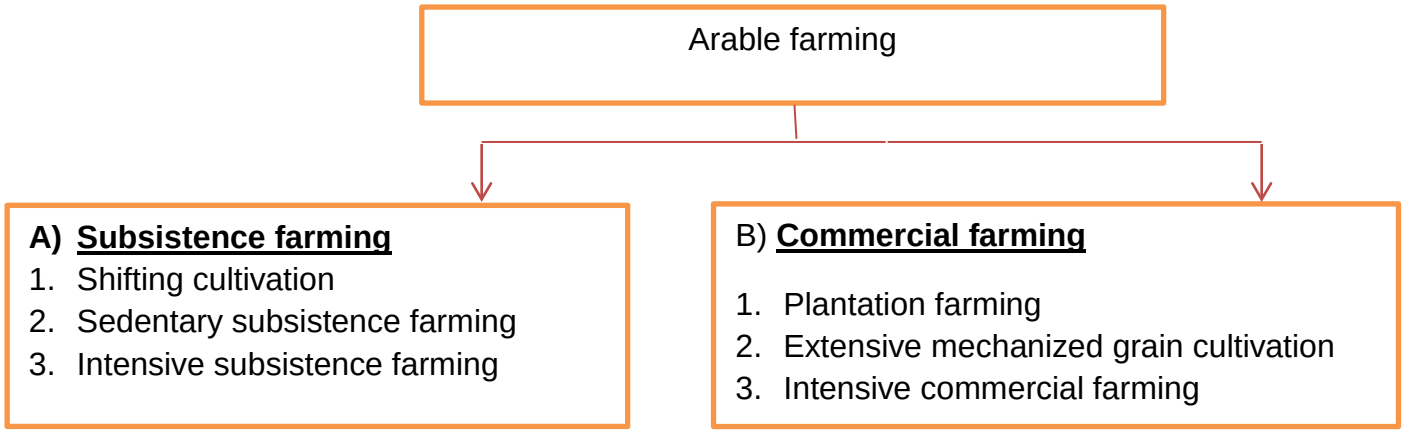
1. Poor pricing policies and price control.
2. Imposition of high taxes on agricultural inputs.
3. Failure to protect agriculture from negative effects.

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

- **CHART SHOWING CLASSIFICATION OF FARMING**





CLASSIFCATION (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 framing
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 **slush** and **burn** agriculture
- ✓ Shifting cultivation is known by different names in different parts of the world.
- ✓ In **Zambia** it is known as ***citemene***, in **zimbabawe** 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 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 mounts 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

- 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 **HIC**s and the rice growing in **LIC**s 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 of wheat farm in **HIC**s, the nomadic herding in **LIC**s, mechanized sorghum and wheat farming in **Wajaale**, 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

- 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

- Cereals 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**. botanically it is called **Zea Mays**



Growing conditions of maize

- A growing season between 3 to 6 months or 150 and 210 days.
- **Altitude** of **2200 m** above sea level.
- Daily temperatures between **20^0C** to **25^0C** and night temperature should not fall down 15^0 C.
- An annual rainfall of **620 mm** to **1000mm.**
- Well-drained fertile alluvial or loam soil, rich in **NPK**.
- It cannot withstand **water-logging**.
- Prefers soils with neutral pH or alkaline.
- 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.
- **U.S.A**. is the **largest producer** of maize.
- Argentina is the second most important maize producer and exporter.

PESTS AND DISEASES OF MAIZE AND THEIR CONTROL

Field pests	Storage pests
1. Stalk borer 2. Army worm 3. Locust 4. Weaver bird	1. Maize weevil 2. Beetles 3. Rats

Control measure of pests	
1. Crop rotation. 2. Use of insecticides. 3. Rogueing. 4. Early planting 5. Use of predators	6. Trapping and killing 7. Poisoning 8. Scaring away 9. Scare crow

Diseases of maize	Control measure of diseases
1. Leaf blight 2. Maize streak 3. Rust 4. Head smut	1. Rogueing. 2. Use of resistant variety **3.** Crop rotation. 4. Early planting. 5. Control of vectors. 6. Use of certified seeds.

2. BARLEY

- In 2017, barley was ranked fourth among grains in quantity produced (149 million **tonnes**) behind **maize, rice** and **wheat**.

Growing conditions of barley

- Average temperature of **15 to 17 °C** during flowering.
- The annual temperatures required range from **5 to 27 °C.**
- 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

- 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.**

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



Growing conditions

- 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 ^{0}C**, and are therefore not grown extensively in tropical and sub-tropical lowland regions.

The main oats regions

- Important **oats producing regions** are the U.S.A., Canada, Britain, Scandinavia, Poland and the C.I.S.
- Minor production regions are in northern Japan and Argentina.

4. RICE

- 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.

Types of rice cultivation

1. The **'dry' system** in which rice grown on dry land.
2. The **'wet' system** in which it is grown on land that is flooded from planting time to harvesting time.

Growing conditions of rice

- **Altitude**: **0** to **3000 m** above sea level
- **Temperature**: **21^{0}C** to **37^{0}C** followed dry sunny period in which the crop ripens.
- **Annual rainfall**: over **2000 mm** (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.**

Consumption of rice

- Rice is the staple food over half of the world's population.
- It is the predominant dietry 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.**

Rice producing regions

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 sulani) 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: **500-800 mm**.
- ✓ Temperature: **20^0C -25^0C**.
- 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.

Field management

- weeding
- fertilizing

PESTS AND DISEASE CONTROL

Pests	Diseases	Control
• Weaver bird	• Downy mildew • Ergot • Head blast	• Use of certified seeds. • Crop rotation. • Rogueing • Use of fungicides • Scaring of bird

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 sea level.
- Rainfall: **625mm**
- Temperature: **25 ^{0}C**.
- Well-drained, **loamy** soil rich in organic matter.

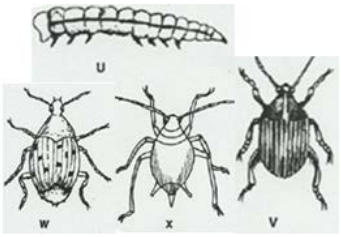
Land preparation

- Beans do not need a fine seedbed as they have large seeds. One primary cultivation and one secondary cultivation will be enough.

Planting

- Beans should be planted at the onset of rain **except** during the long rains as the crop may rot. Planting is done on shallow furrows

PESTS AND DISEASE CONTROL

pests	example	control
• **U** = American boll worm • **V** = Bean weevil • **W** = Bean bruchid • **X** = Bean aphids.		1. Use of insecticides 2. Early planting. 3. Rogueing

Diseases of beans	Control measure
1. Anthracnose	1. Use of resistant variety
2. Mosaic	2. Crop rotation
3. Halo blight	3. Rogueing
4. Angular leaf spot	4. Hot-water treatment

7. SORGHUM

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

- **Why sorghum is drought resistant**?

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. The epidermis of the leaf is corky and covered with a waxy layer, which protects the plant form desiccation;
5. The stomata close rapidly to limit water loss;
6. 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 **630 mm**.
- Altitude: **900** to **1500 m** above sea level.
- Temperature: **30^0C**.
- Fertile, well-drained soil.
- PH: **5** to **8.5**

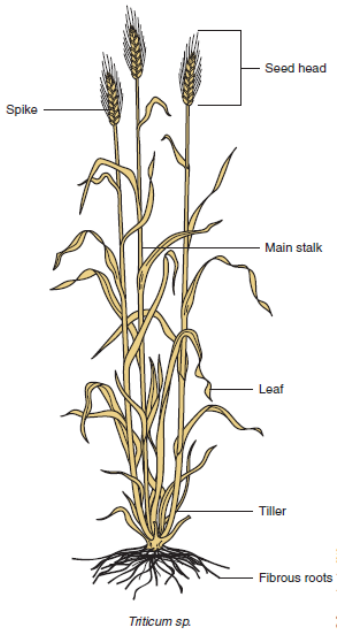
- **Pest and disease control**

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

8. WHEAT

- Wheat is the third most-produced cereal after maize and rice.
- The ***emmer*** and ***einkorn*** wheat seeds are the most common species.
- 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 of wheat



Triticum sp.

- Moderate rainfall: **500 mm** to **1270mm**.
- Temperature: **15^0C** to **20^0C**. Warm condition facilitates maturity of wheat.
- Warm, dry, sunny season for ripening and harvesting.
- Fertile soil.
- **Flat land**: fairly level land allows proper drainage and mechanized cultivation.

Wheat cultivation

- Wheat is cultivated as cash crop because it produces a good yield per unit area.
- Grows well in temperate climate between the latitudes of **30^0N** and **40^0 N,** and **25^0 S and 45^0 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 food surplus.

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 and palatable foods such as pasta, bread and biscuits. Wheat is the most important source of carbohydrate in the world.

Wheat disease

a) In temperate climate

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

b) In tropical areas

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

Wheat growing regions

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

Wheat production and world trade

- The **C.I.S**. is the **largest grower** of wheat, producing more than 25% of the world's total annual production.
- 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 and Australia.
- Most of the exported wheat goes to Japan, China, India, the U.K. and West Germany.

(b) BEVERAGE CROPS

1) SUGAR CANE

Growing conditions of sugar cane.

- Temperature: **21^0C** to **27^0C**.
- Altitude: **0** to **1600m** above sea level.
- 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 sugar cane

- 80% of world's sugar production comes from sugar cane 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 sugar cane

- 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 **22^0 N** and **22^0 S, and** some up to **33^0 N and 33^0 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.

Harvesting

- The canes are cut off a few centrimetres 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 remain 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**.



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 boiling house.

d) **Evaporating and colorization** of the pure sugar juice by adding **SO_2, (**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 farther 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, Dominica 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).

- 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 1.5 m.
- The plant grows best in tropical and sub-tropical monsoon regions.

Growing conditions of tea

- Temperature: **15^0C** to **30^0C**.
- 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 **Brahmuptra** 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 **26^0C** with range less than **10^0C.**
- An annual rainfall of at least **2000 mm.**
- **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 the 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

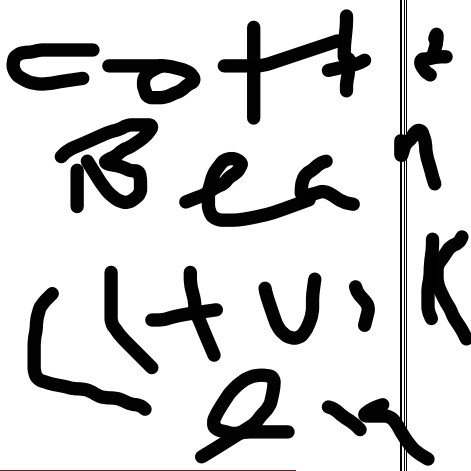
- The largest producers and exporters are of cocoa are Ghana, Nigeria, Brazil, Ivory Coast, Cameroon and Ecuador.
- **Ghana** is the **world's largest** producer of cocoa beans.
- The cocoa farms of a Ghana employ almost half a million workers and the export of cocoa beans forms more than 50% of Ghana's 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 methyl bromides
2. The application of pyrenoids
3. Hermetic storage in sealed bags(airtight)

4) COFFEE

- The coffee plant is perennial shrub which is extensively cultivated in latitudes between **30^0 S** and **28^0 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 **2000 mm**.
- High altitude: **1000m** to **2300 m** above sea level.
- Cool to hot temperature: **15^0C** to **30^0C**.
- 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 ripe 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

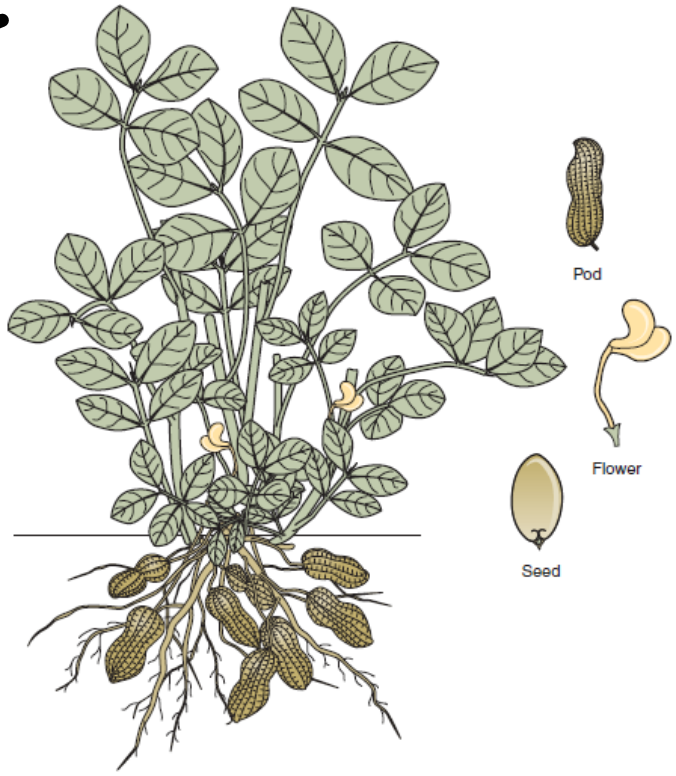
- Most of the world's coffee is grown on the tropical highlands of Latin America and Africa at heights from 450 to 750m above sea level.
- The largest **producer** and **exporter** is **Brazil** followed by **Colombia, Ivory Coast, Uganda, Angola, Mexico, Indonesia, Ethiopia India,** and **El Salvador.** Also, other African producer counters 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) OIL CROPS

1. Groundnut
2. Sesame (**simsim**)
3. Oil palm

1. GROUND NUT

- **Scientific name**: Arachis hypogaea



Arachis hypogaea

Growing conditions of groundnut

- **Rainfall**: 500 mm
- **Temperature**: average temperature of about **26^0 C**.
- **Soil**: well-drained soil.
- **Altitude**: **1500 m** above sea level.

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.

2. SESAME

- Sesam (***Sesamum indicum***) is a flowering plant in the genus *Sesamum.*
  - **Origin**: India.
  - World production in 2016 was 6.1 million tonnes, with **Tanzania**, **Myanmar**, **India**, and **Sudan** as the largest producers.

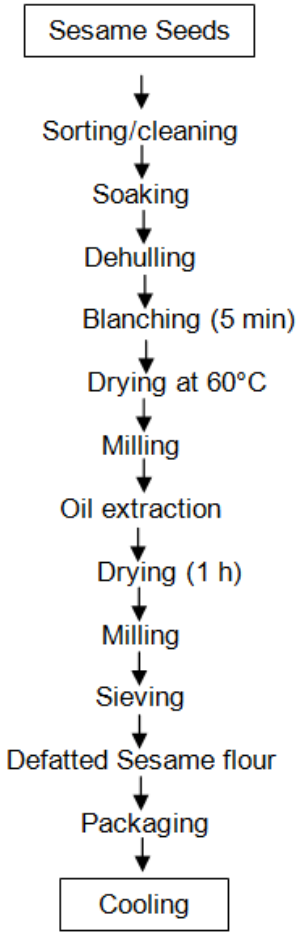
Growing conditions of sesame.

- **Rainfall**: **400 mm to 500 mm**, moderately drought resistant.
- Grows best with **750 mm**.
- Warm temperature: **25^0 C to 30^0 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**).

Sesame processing

1. **CLEANING**: After harvesting, the sesame seeds are cleaned and hulled.
2. **HULLING**: Hulling machine to separates the hull from the seeds.
3. **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.
4. **SORTEXING**: The seeds are graded by size, density and colour.
5. **PACKING**: For packing Sesame Spices and related products poly-packs and multiwall paper bags, Jute bags are used.

Extracting oil from sesame seed



3. OIL PALM

- 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 sea level**.
- 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 21^0 **C** throughout the year.
- **Rainfall**: over 2000 mm per year.
- **Altitude**: 1000 metres above sea level
- **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 weeding.
- **Transport**: 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.
- **Management**: the crops must be inspected frequently for any disease or pests.
- **Capital**: money is required to maintain the vehicles, factors and labor wages.

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 u to **15 metres**. These trees take between 8 and **10** years to maturity.

Harvesting

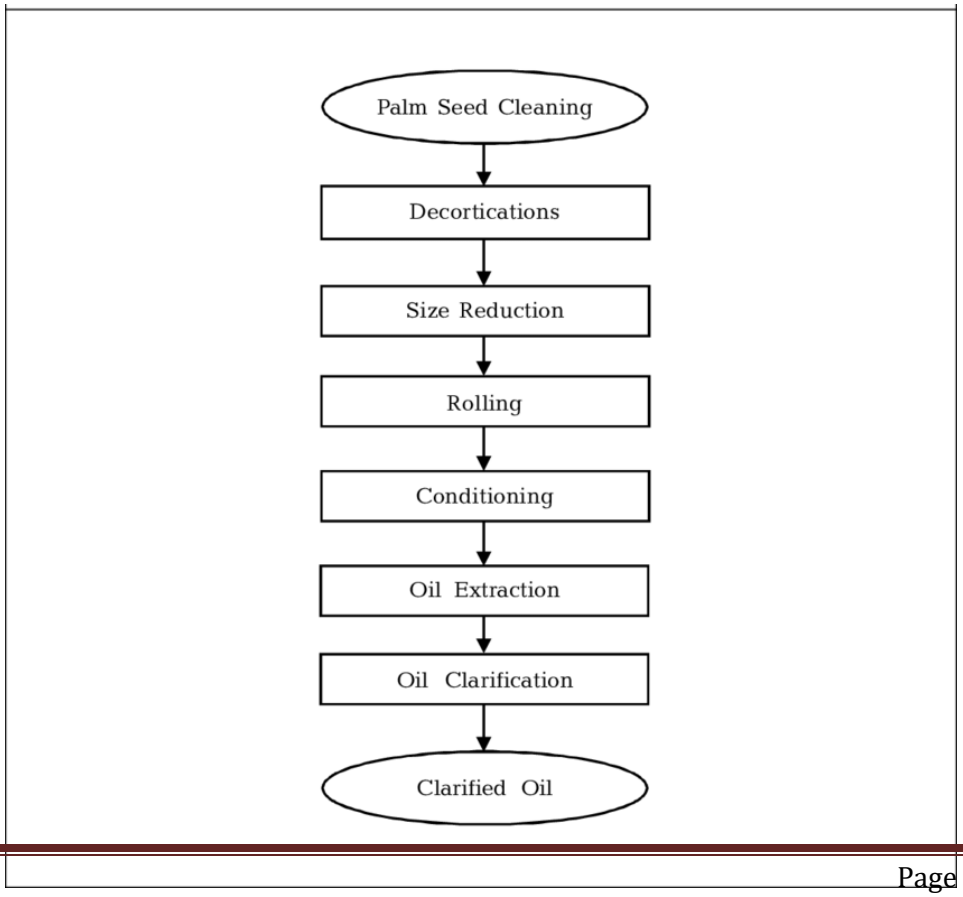
- The oil palm fruits are known to be ripe when they change their color to deep orange or red. Plenty of sunshine is essential for the fruits to ripen.
- Harvesting is done by cutting the base of the bunch using knife which looks like a chisel. Fruits are harvested every **5** to **10 days**. Harvesting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

1. Traditional
2. Use of hand pressure
3. Use of mills



(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.

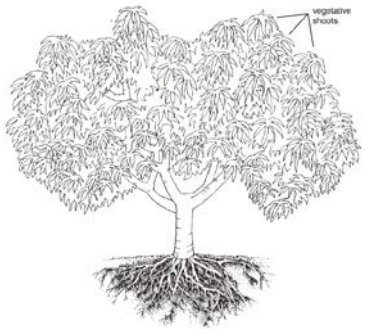
Pomoculture

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

1. MANGO

- Mango tree is a tropical perennial, evergreen plant which bears a juicy fruits resembling 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: 40^0 F to 50^0 F
- **Soil**: well-drained soil with pH: **5.5** to **7.5**
- Frost free growing period
- Dry period for flowering and fruiting.

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

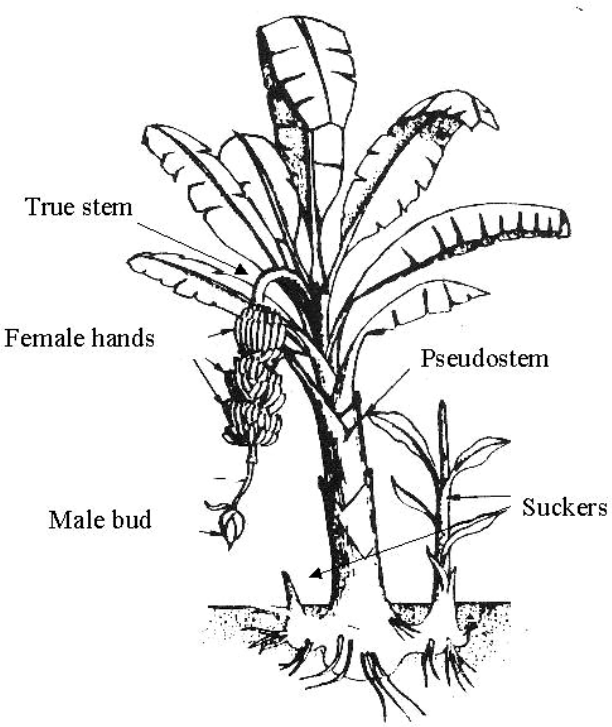
- Mango is harvested when its color changes into yellow, red or even when green to ripen room temperature of between **18^0C to 22^0C**.

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 sulphurat 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

Agro Climate

- 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** (78-86F) with RH regime of 75-85%. Growth begins at **18ºC**, reaches optimal growth at **27ºC** and stop entirely when temperature reaches **38ºC**.
- 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.

Varieties

- The most commonly cultivated Bananas are **Berangan** and **Canvendish**.

Planting Material

- 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.

Planting Time

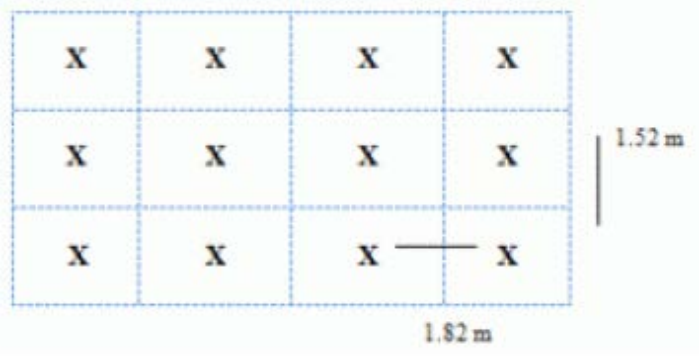
- Tissue culture Bananas can be planted throughout the year.

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** belonged to the family of **Myrtaceae**. Contains about **100 species** of tropical shrubs and small trees. Guava fruits were used for both eating a 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 **1500 mm**.
- 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

- Family: **Rutaceae**, **Originates** South East Asia.
- **Major producers** are: Brazil (1st), USA (2nd) and China (3rd)

General botany of citrus fruits

- Citrus has **two** subgenera

1. **Papeda** is **inedible** because of the acrid oil in juice sacks which is bitter.
2. **Eucitrus**: is the **edible** citrus and has 10 spp out of which 8 spp are cultivated.

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

USES OF CITRUS FRUITS

1. Good source of vitamin “C” and energy- source of food
2. Cattle feeds
3. Means of employments
4. Raw material for agro-industries
5. Sources of incomes

Growing conditions of lemon

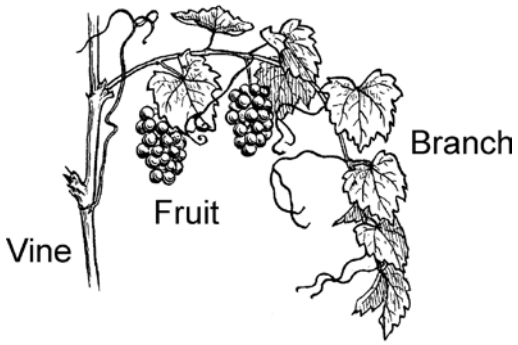
- **Temperature**: optimal growing temperature is **15-30 ºC**.
- **Rainfall**: 1150mm-1500mm per annum with even distribution
- **Soil**: well-drained fertile soil.
- **Altitudes**: **0 to 2000 m** above the sea level.

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*



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 the 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 destroys 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 blocs
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 optimity by incroporating 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 effective pollinizer varieties and pollinators (Honey bees).
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

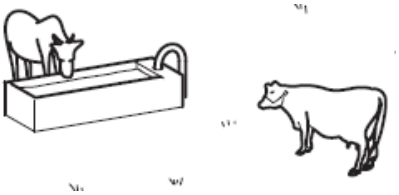
1. Cattle farming.
2. Sheep farming.
3. Poultry farming.

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 involve 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

Sheep farming

- 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 750 mm.
- 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 higher rainfall.

1. Australia.

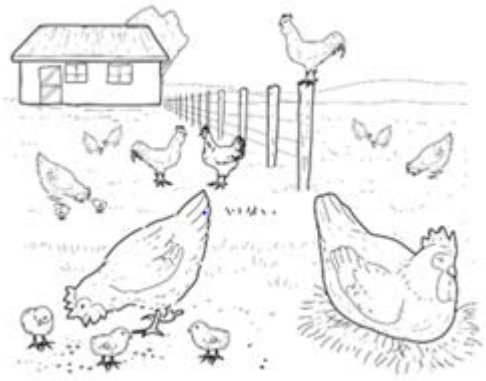
- This country has approximately 150 million sheep which makes it one of the most important sheep rearing countries in the world.
- Most of the sheep are reared for their wool.

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.

Poultry farming

- 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

MAIN TYPES OF FIBER

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

A. Plant fiber

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 the seeds.
- 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 and Africa.
- Cotton is made from the fibers of the fruit of the cotton plant.
- The fruit is like a pod and is called a boll.
- It contains black seeds which are embedded in a mass of white fibers, which is often called cotton lint.

Types of cotton

- There are four commercially grown species of cotton, all domesticated in antiquity:

i. ***Gossypium hirsutum*** – upland cotton, native to **Central America**, Mexico, the Caribbean and southern Florida (90% of world production)
ii. ***Gossypium barbadense*** – known as extra-long staple cotton, native to tropical South America (8% of world production)
iii. ***Gossypium arboreum*** – tree cotton, native to India and Pakistan (less than 2%)
iv. ***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 3 cm.

(b) **Long staple cotton**: when it is over 3 cm.

Growing conditions of cotton

1. **Annual rainfall**: 500mm (about 20 in) and 1000mm (about 40 in).
2. **Growing season**: 200 days.
3. **Temperature**: 21^0C (about 70^0 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 world trade

- 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 home markets.
- 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 is a tropical plant whose fibers are used for making string, rope and a coarse cloth used for matting.

Sisal growing conditions

1. **Temperature**: average monthly over 24^0C (about 75^0 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.

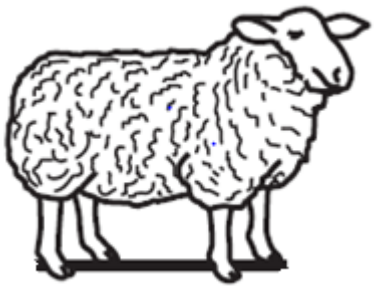
Sisal regions and trade

- 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 (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**.
- 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

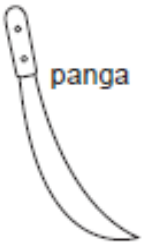
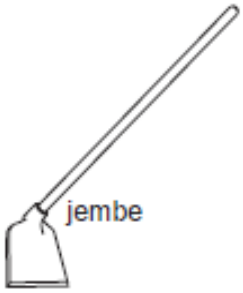
Silk regions and trade

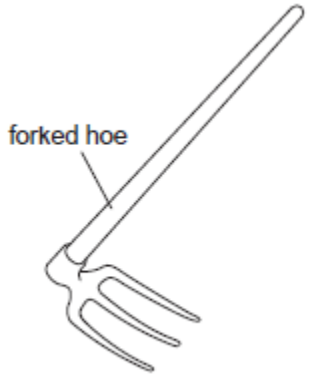
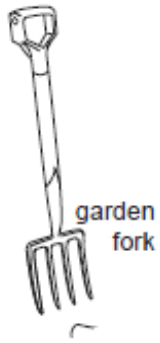
- **China** and **Japan** are the main silk-producing countries of the world.
- The **chief** silk **exporters** are **Japan, Italy, China** and **Thailand**.
- The U.S.A. and the countries of north-west Europe are leading importers.

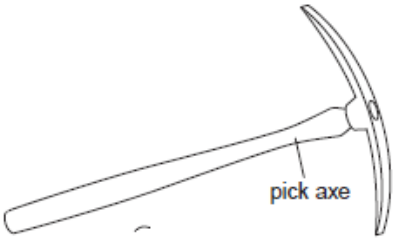
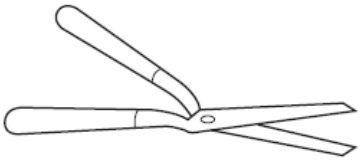
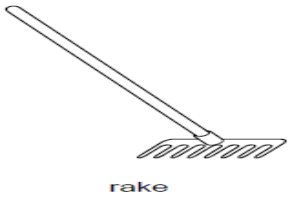
FARM TOOLS AND EQUIPMENTS

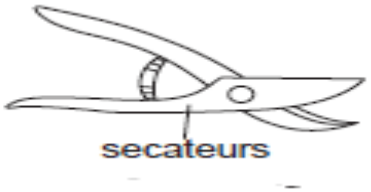
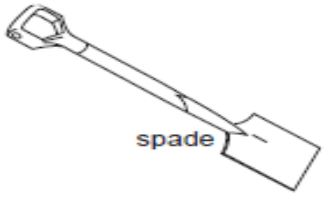
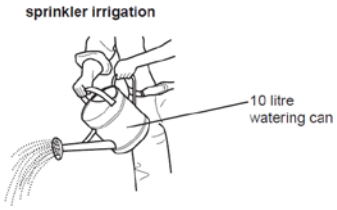
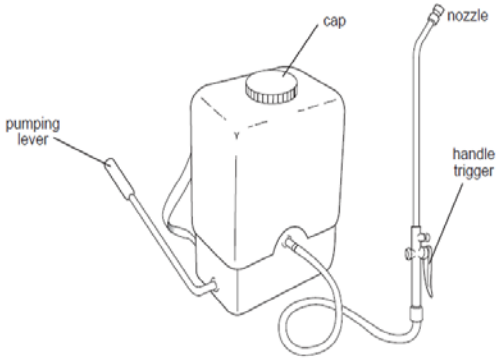
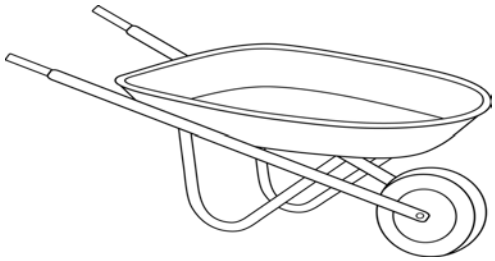
- Farm tools are devices used to carry out certain activities on the farm.

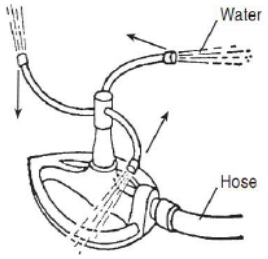
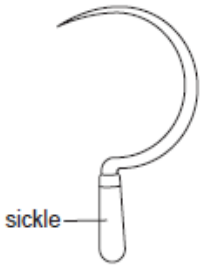
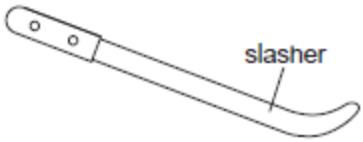
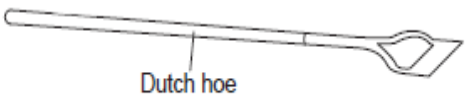
1. Garden tools and equipment

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.
Jembe **or** hoe 	• Seedbed preparation • Planting • Weeding • Harvesting of root crops.	• 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.

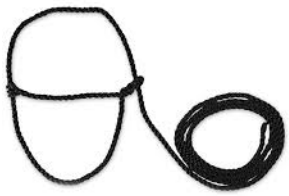
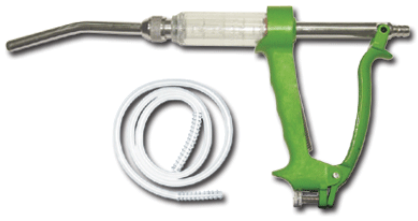
forked jembe **or** forked hoe  	• Weeding rhizomatous weeds • Opening virgin land • Cultivating stony grounds • Digging sticky soils.	• Clean and dry it after use • Replace the handle if broken • Straighten prongs by hammering if bent • Oil prongs to prevent rusting • Keep the handle firmly fixed • 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 nursery bed.	• 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
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 	• 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.

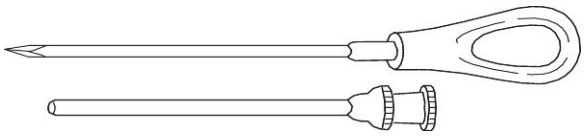
Secateurs 	• Pruning tree crops • Harvesting flowers • Cutting vegetative materials for planting.	• Sharpen the cutting edges • Lubricate the pivot • Oil to prevent rusting.
Spade 	• Removing of soil when constructing farm • Mixing sand, cement, and gravel in farm building construction.	• Keep the handle firmly fixed • Clean and dry after use • Replace the broken handle.
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

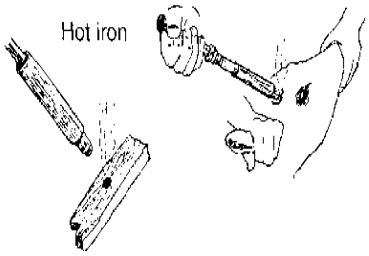
Spring balance 	• Weighing products of small masses.	• Keep it clean and dry to avoid rusting • Avoid weighing heavy products beyond recommended weight.
Sprinkler 	• Irrigating crops.	• Oil and grease moving parts • Replace broken parts.
Sickle 	• Harvesting cereals. • Cutting grass.	• Sharpen cutting 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.

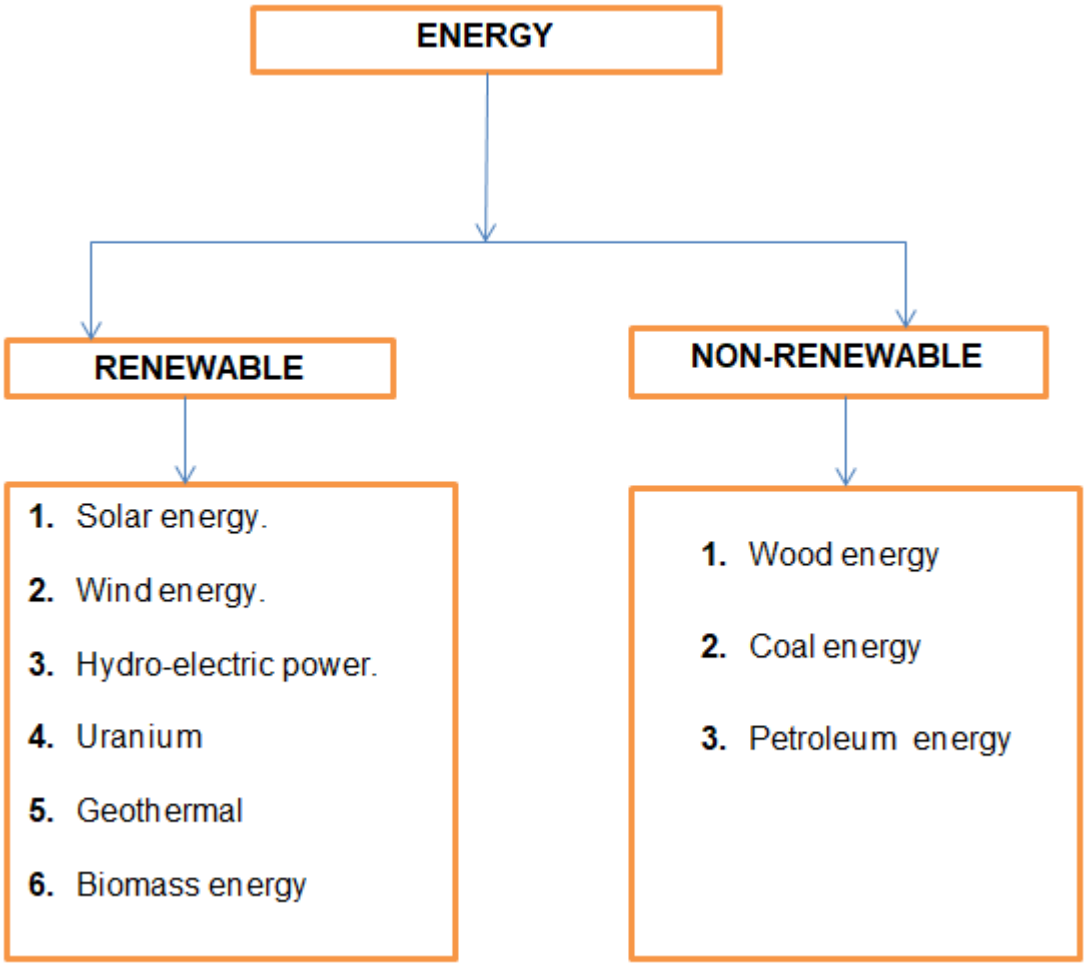
CHAPTER 2: SOURCES OF ENERGY

- **Energy** is the power required to run a machine or to assist human in production.
- **Power** is the amount of work done per unit of time.

- **TYPES OF ENERGY**

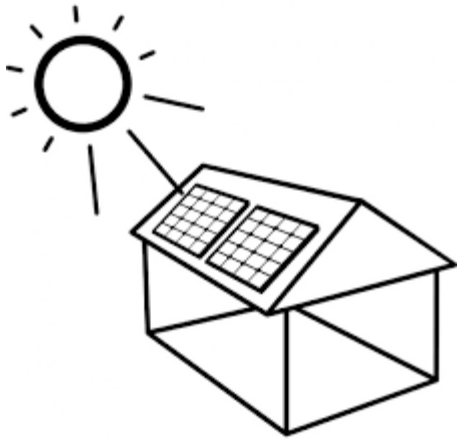
1. Renewable.
2. Non-renewable.

- **Renewable**: those sources that can be regenerated and used over a long period of time.
- **Non-renewable**: are exhaustible if they are not well managed.



A) RENEWABLE SOURCES OF ENERGY

1) SOLAR ENERGY



USES OF SOLAR ENERGY

- Heating of water
- Lighting homes
- Drying crops
- Pumping.

ADVANTAGES OF SOLAR ENERGY

1. Cheap- absulately free.
2. Easily available in all parts of the world.
3. Easy to trap and reqiure minimal maintainence cost.
4. Clean, no pollution.
5. It can be stored and used later.
6. It can be used in a different ways.
7. It is an inexhaustible.
8. Lessens the dependence on oil.

DISADVANTAGES OF SOLAR ENERGY

1. Has limited use.
2. The storage batteries are cumbersome and must be replaced often.
3. Solar panels are expensive.
4. Solar technology is new most people do not use it.



2) WIND ENERGY

ADVANTAGES OF WIND ENERGY

1. It is an inexhaustible source of energy
2. It is cheap source of energy
3. It is clean source of energy which does not pollute the environment
4. It can be produced on a small-scale basis for local consumers.
5. The land between the windmills can be used for other purposes e.g. agriculture.
6. It is an excellent supplement to other sources of energy such as the sun.

DISADVANTAGES OF WIND ENERGY

1. Relatively expansive to maintain.
2. Low energy production.
3. It is not fully reliable because the wind may change direction.
4. Reqiures large tract of open land.
5. Generates low energy compared to the cost incurred in the making of windmills.

PROBLEMS FACING THE EXPLOITATION OF WIND ENERGY IN SOMALILAND

1. Lack of appropriate technology
2. Lack of data on wind regime
3. Lack of proper promotion strategies.

3) GEOTHERMAL ENERGY

ADVANTAGES OF GEOTHERMAL ENERGY

1. Cheap- no actual fuel is used to turn the turbines.
2. It is an inexhaustible source of energy.
3. It reduces the overdependence on the exhaustible energy sources.
4. It is good supplement to other sources of energy.
5. The cost of operating is low compared to hydro-electric.

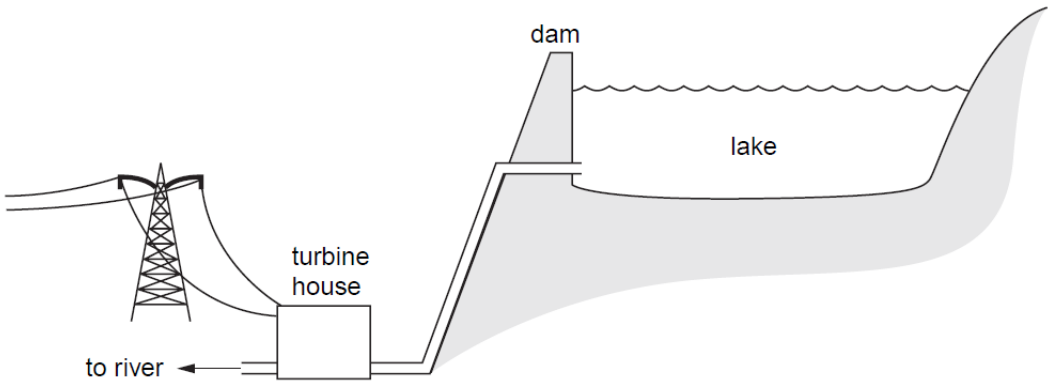
DISADVANTAGES OF GEOTHERMAL ENERGY

1. There is a lot of noise.
2. It is not available in many areas.
3. Reqiures advanced technology.
4. The gases that are released together with the steam may be harmful to the environment.
5. Low energy production.

4) HYDRO-ELECTRIC

FACTORS THAT FAVOR THE LOCATION OF HYDRO-ELECTRIC POWER

1. **Steep gradient** to provide fast-flowing water with massive hydaulic force to drive the turbines.
2. **Constant supply of a large volume of water** to ensure continuous generation of power.
3. **Hard basement rock** to provide a firm foundation for the construction of a dam. The basement rock should be non-porous to prevent seepage.
4. **Presence of a deep valley** to save on the cost of construction of the dam to provide space for a reservoir.
5. **Sparse population** so to minimize relocation of people.
6. **Availablity of market** for the power so as to justify its production.
7. **Availability of capital** for construction of hydroelectric power project and for maintenance of the projects.



ADVANTAGES OF HYDRO-ELECTRIC POWER

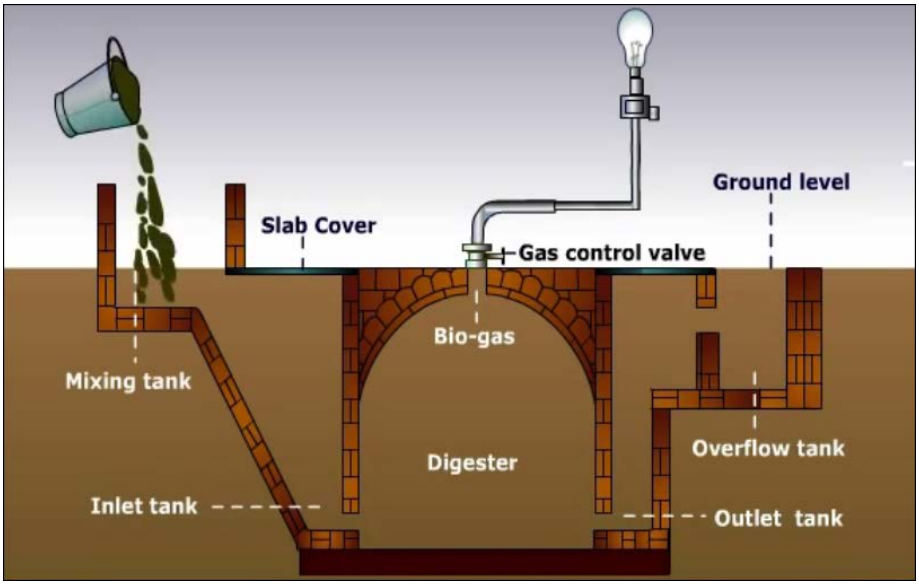
1. Provision of electricity for both industrial and domestic use.
2. Foreign exchange.
3. Fishing ground for local communities.
4. Modifies the local climate and more vegeatation is growing around them.
5. Controls flooding.
6. Improvement of infrastructure.
7. Creates employment opportunities.
8. Provides water for irrigation.
9. The government earns revenue from the sale of electricity locally
10. Tourist attraction.
11. Provide water for domestic use.
12. Clean, no pllution.
13. It is an inexhaustible source of energy.
14. Can be transmitted over long distance using cables.
15. It is easy to use as one only needs to operate simple switches.
16. HEP can be put into many uses, e.g. cooking, lighting, cooling and heating.
17. Can be used almost through out the world.

DISADVANTAGES OF HYDRO-ELECTRIC POWER

1. Fluctuation of the water levels in the reservoirs.
2. Inadequate capital for HEP development.
3. Siltation of the reservoirs
4. Displacement.
5. Diseases.
6. Separation of people.
7. The initial cost is high.
8. Once generated, HEP cannot be stored.

5) BIOMASS

- The main sources of biomass energy include agricultural wastes which consist of crop residue.
- Animal waste such as cow **dung** is also used to produce biogas.
- Biogas is a combustible gas which is generated by the fermentation of organic material such as cow dung.
- Biogas burns with a hot blue flame and can be used for cooking using gas burner



ADVANTAGES OF BIOGAS ENERGY

1. Biomass is an inexhaustible source of energy as long as there is organic matter.
2. It is cheap sources of energy as it makes use of waste products.
3. The production of biogas does not require advanced technology.
4. Biomass is available through out the world.
5. Clean burning.

DISADVANTAGES OF BIOGAS ENERGY

1. Biogas cannot be used in congested areas such as urban centres because there has to be enough space to set up the digester.
2. It cannot be transported to distant places.
3. It contributes a great deal of pollution particularly if materials are burned directly.

6. URANIUM

- Uranium is a naturally occuring radioactive minerals.



USES OF NUCLEAR ENERGY.

1. Generation of electricity.
2. Making atomic weapons

ADVANTAGES OF NUCLEAR ENERGY

1. It is reliable source of energy due to a relatively long-lasting supply of raw materials
2. A large amount of energy is produced in nuclear reactors
3. It does not cause pollution

DISADVANTAGES OF NUCLEAR ENERGY

1. Construction of nuclear reactors requires a lot of money and expertise.
2. The waste from the nuclear power plants are highly radioactive.

B) NON-RENEWABLE SOURCES OF ENERGY



1) WOOD.

- Wood fuel refers mainly to firewood and charcoal.
- This is the most common source of energy particularly in developing countries.
- More than **98%** of **Somaliland's** energy comes from wood fuel.



ADVANTAGES OF WOOD ENERGY

1. it is available through out the world.
2. No maintainence cost are reqiured.
3. The ashes can be used for plastering traditional houses.
4. It is cheap source of energy.

DISADVANTAGES OF WOOD ENERGY

1. Cutting of trees for wood fuel leads to deforestation and soil erosion
2. Wood fuel is dirty due to the soot and smoke that is given off when wood is burnt.
3. A lot of wood is reqiured because it has less energy output.
4. The gases emitted when wood is burnt pollute the environment.
5. It reqiures big storage area.

2) COAL

- Coal is a black or brown rock chiefly made up of carbon, formed millions of years ago from the compression of vegetative matter.

CAUSES OF THE DECLINE OF THE USE OF COAL

1. Use of alternative source of energy which are cheaper e.g. petroleum.
2. Exhaustion of old mines and lack of economically accessible reserves.
3. High cost of production.
4. High cost of transportation.

TYPES OF COAL

1. **Peat**: brownish fibrous substance which is in the early stages of coal formation.
2. **Lignite**: brown coal which has a carbon content of less than **4%**, and which gives out only moderate amount of heat.
   - It is used mainly for the production of thermal electricity.
3. **Bituminous**: a coal which has a carbon content of between **45%** and **80%**.
   - Because of this, it gives off more heat than lignite.
4. **Anthracite**: is a very hard coal which has at least a **90%** of carbon content.
   - This enables it to burn with great heat; and little smoke.

ADVANTAGES OF COAL ENERGY

1. It is more efficient in generating thermal electricity than oil.
2. Siutable for smelting iron ore.

DISADVANTAGES OF COAL ENERGY

1. It is exhaustible source of energy.
2. It is bulky, hence difficult and expensive to transport.
3. Causes environmental degradation.
4. Coal has low heat energy.
5. Causes environmental pollution from smoke produced.

3) PETROLEUM

- Petroleum is fossil fuel and is also called crude oil.

ADVANTAGES OF PETROLEUM

1. Easily obtained from the ground.
2. Can be transported cheaply and easily by tankers and pipelines.
3. Can be used to generate other sources of energy.
4. Have wide range of domestic and industrial uses.

DISADVANTAGES OF PETROLEUM

1. Crude oil is bulky.
2. It is exhaustible source of energy.
3. Burning of petroleum pollutes the environment.
4. It is expensive
5. It is highly flammable.

ENERGY CRISIS

- An **energy crisis** is a situation whereby the demand for oil is higher than the amount that is being supplied, leading to high oil prices.
- As the price of oil increases, the prices of almost all other products and services also increase.

CUASES OF ENERGY CRISIS

1. Sharp rise in demand.
2. Withholding of oil by producing countries during wars.
3. The depletion of oil reserves.
4. The control of oil resources by a few petroleum-producing countries.
5. Unequal pattern of crude oil distribution in the world.

EXAMPLES OF ENERGY CRISIS IN THE PAST

a) **1973** and **1974** when there was war between Israel and Arab countries. The Arab countries which are **OPEC** members withheld oil supply to Israel supporting countries, USA and the result was sharp increase in oil prices.

b) 1991 first Persian Gulf War caused by Iraq invasion of Kuwait. Causes of the war were:

1) Iraq's claim that Kuwait was its territory.

2) Kuwait was taking oil from Iraq "soil from Rumania fields which lay beneath both countries.

3) Kuwait was exceeding the oil production limits set by OPEC.

- Many Kuwait's oil fields were set on fire and Iraq dumped about 465 million gallons of Kuwait's crude oil to the Persian Gulf. These resulted major oil crisis which was worsened by the trade embargo.

c) 2003 second Persian Gulf War. Iraq had failed to destroy weapons of mass destruction which she had agreed to do for the 1991 war end. The war led to rapid increase in oil prices from US$ 35 at start of war to US$50 by 2004. It forced OPEC members to increase daily crude oil output by 8% to stabilize the price.

EFFECTS OF ENERGY CIRSIS

1. Consumption of large amount of foreign exchange due to increased oil imports
2. increased transport cost due to increased fuel prices.
3. Increased cost of commodities.
4. Reduced consumption of goods and services.
5. High cost of production of power using generators.
6. Widespread of unemployment due to lay off in some workers.
7. Depletion of oil reserves due to increased demand.

MANAGEMENT AND CONSERVATION OF ENERGY

1) **Management of energy**: refers to the effective planning and control of available energy resources.
2) **Conservation of energy**: entails using the available resources in the most efficient manner to ensure there is no wastage.

MEASURES TO CONSERVE ENERGY

1. Controlling importation of fuel consuming vehicles.
2. Encouraging people to use public transport.
3. Creating awareness on importance of conserving energy.
4. Planning road network to reduce traffic jams which leads to consumption of more fuel.
5. Development and use of renewable sources of energy, e.g. solar energy.
6. Planting of trees to ensure availability of wood fuel.

CHAPTER 3: TRANSPORT, COMMUNICATION AND TRADE

- Transport is the activity of moving people and goods from one place to another.

MODES OF TRANSPORT

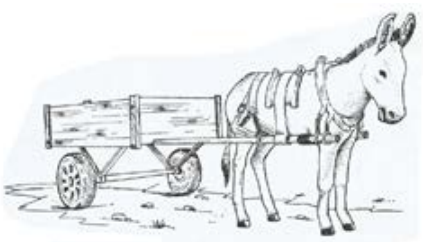
1. Land transport
2. Air transport
3. Water transport

(a) Human and animal transport

- Human porterage is the earliest known of form of transport.
- Domesticated animals like oxen, horses, camels and donkeys are used by human beings.
- Animals may be used to physically carry goods on their backs or they may be made to pull loaded **carts**.

Advantages of human and animal transport

1. Affordable in terms of cost.
2. Availability
3. Safety
4. Flexibility
5. Environmental conservation
6. Employment opportunity



Harnessed donkey with a cart

Disadvantages of human and animal transport

1. Security problems
2. Low speed
3. Limited carrying capacity.
4. Regional boundaries



(b) Railway transport

- Transporting people and goods using trains.

Advantages of railway transport

1. Very siutable for carrying bulky and and heavy goods.
2. It is cheap means of transport.
3. It is less affected by poor weather conditions.
4. Accidents are minimal.
5. Railway follow a regular timetable hence help people to plan their movement.
6. it is very economical to run a large train.
7. The stations have warehouse facilities for the storage of goods.



Disadvantages of railway transport

1. It is slow.
2. It is not flexible
3. It is unevenly distributed
4. There is use of varied guages

Examples of Railway Links in Africa

- **Tazara railway**: connects Zambia Copper Belt with the sea port of Dar-es-salaam.
- **Benguela Railway**: runs from Zambia Copper Belt to Angola.
- **Kenya-Uganda Railway**: runs from Mombasa to Kisumu and through Tororo to Kampala.

(c) Road transport

- This is the most widespread means of land transport. It means of transportation of people and goods by motor vehicle on roads.

Types of roads

1. **All weather raods-**which are used all year round i.e. tarmac and murrum roads.
2. **Dry weather raods-**which are used during the dry weather.
3. **Motor able truck-** which are used by people on foot or by vehicle on dry season.

- Atruck is a path or rough road made by people, vehicle or animals.

Principal Trans-Continental Highways in Africa

- **Great North Road** connecting Cape Town and Cairo throgh Tanzania, Kenya, sudan and Ethiopia.
- **Trans-Africa Highway** from the port of Mombasa to Dakar in Senegal throgh east and Central Africa.
- **Dakar-Djamena Highway** through Core De Ivoire, Nigeria and Chad.
- **Trans-Sahara Highway** from Lagos to Tripolia through Algeria.

Advantages of road transport

1. Flexibility
2. Faster speed
3. Cheap
4. Progressive development
5. Variety of grades
6. Variety of vehicles
7. Promotion of small-scale business.

Disadvantages of road transport

1. Traffic jams
2. Expensive over long distances.
3. Uneconomical due to limited carrying capacity
4. Prone to theft and accidents
5. Affected by the weather
6. Environmental pollution

(d) Pipeline transport

Pipeline transport refers to the means of movement of mainly fluid products through pipes from one place to another.

Advantages of pipeline transport

1. Constant supply
2. Reliable and convenient
3. Low operating cost
4. Unaffected by the weather
5. No traffic jams
6. Free of pollution
7. Flexible i.e. applicable in place where roads and railways cannot be used.

Disadvantages of pipeline transport

1. Selectivity: can be used for only one type of fluid at a time.
2. Leakages.
3. Permanence
4. Insecurity
5. Requires heavy initial capital.
6. Requires constant supply of the commodity
7. Can cause pollution when they burst.

WATER TRANSPORT

- This is the all movement of goods and people over waterways.

Classification of water transport

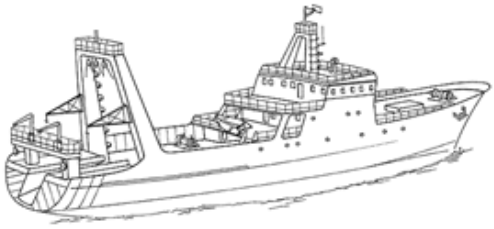
1. Sea waterways.
2. Inland waterways.

Sea waterways

✓ Sea transport involves the movement of goods and people over seas and oceans

Advantages of water transport

1. It is the cheapest form of transport for large bulky loads.
2. The route is free. It uses natural routes.
3. It accommodates vessels of any dimensions.
4. The accidents are minimal.
5. There is no traffic jams.



Disadvantages of water transport

1. May be very expensive.
2. It is slow means of transport.
3. Not all countries have access to the seas e.g. Ethiopia.
4. Port congestion may lead to delay of delivery.

Problems facing water transport in Africa

1. Lack of political cooperation which makes it difficult to have joint construction.
2. Inadequate capital to establish navigation systems.
3. Low volume of goods which makes some parts uneconomical.
4. Insecurity- Sea pirates along the coast of Somalia.
5. Lack of navigable rivers due to rapids and waterfalls.
6. Sea storms which interferes with navigation

Important Canals

1. **The Suez canal**
   - This canal is 160 km long and it connects the Mediterranean and Red sea.
   - It has no lock the movement of ships through it is therefore very easy.
   - An important cargo transported through this canal was oil from the Persian Gulf region to North-West Europe.

2. **The panama canal**

- This canal joins the Atlantic Ocean with the Pacific Ocean. It is 80 km long and it has three sets of locks which makes the movement of ships through it slower than through the Suez Canal.

3. **The St. Lawrence seaway**

- The construction of a series of deep water canals and locks on the St. Lawrence was completed in 1960 to enable ships of up to 10,000 tons to reach the great lakes from the Atlantic Ocean.

MEANING OF CONTAINERIZATION

- Containerization means packing goods in large standards- sized boxlike structures which are filled in a factory.

Advantages of containerization

1. It saves space in a ship as their dimensions are less uniform.
2. It speeds the process of handling of goods hence saves time.
3. It reduces loss of goods through theft.
4. Checking of the containers at the port of entry is fairly easy.

Disadvantages of containerization

1. Lack of employment- most of the work is done by machine.
2. Falsifying the content may lead to failure of customs to levy duty hence loss of valuable income to the government.
3. It is expensive.

Major sea routes in the world

1. **Panama Canal sea route.**

- This route connects the pacific and Atlantic ocean.
- It enables goods to be transported between Europe and Australia and between the coast of North America and the western coast of South America.

2. **Cape of Good of Hope sea route**

- This route serves the eastern and western coast of Africa, south-east Asia, New Zealand and Australia.

3. **North Pacific of sea route**

- This route serves the industrialized nations of Asia, .e.g. japan, Singapore, Hong Kong and south Korea and western North America.

4. **North Atlantic sea route**

- This route serves the industrialized nations of North America and Europe.
- It connects Western Europe to eastern North America.

5. **Mediterranean Asiatic sea routes**

- This route connects Europe to Africa and the Far East countries.

6. **Trans-Atlantic sea route.**

- This route connects Europe to eastern South America.

INLAND WATERWAYS

- This involves the movement of goods and people over inland water.
- The main means of inland water transport include navigable rivers and lakes.

Many river in Africa are not navigable due to:

1. The nature of the African landscape with steep slopes, e.g. east Africa highlands.
2. Shallow, narrow and fast-moving water that is not suitable for navigation, e.g. Zambezi River.
3. Presence of rock obstacles that hinder the movement of vessels, e.g. Congo River.
4. The rivers are also affected by a siltation
5. Most of the rivers suffer seasonal fluctuation.
6. Some rivers have floating vegetation which makes the navigable canals very narrow.

AIR TRANSPORT

- This refers to the movement of goods and people using aircraft like aero planes.



Advantages of air transport

1. Fast speed and efficiency.
2. Comfort
3. Low risk of damage
4. Fixed time schedules
5. No physical barrier like mountains
6. Safety.

Disadvantages of air transport

1. Expensive.
2. Requires highly trained personnel.
3. High-risk accidents.
4. Air piracy risks
5. Affected by weather changes.
6. Limited carrying capacity.

COMMUNICATION

- Communication is a process of transmitting information from one person to another.



Telecommunication services

1. Telephones
2. Facsimiles (fax)
3. Internet service

Types of communication



1. **Verbal communication**

- This is the transfer of messages by word of mouth.

2. **Written communication.**

- Involves conveying messages through writing.

3. **Audio-visual communication.**

- This include sending messages using a combination of sound, signs and pictures
- This form of communication requires both senses of hearing and seeing for effective communication to take place.

Similarities of transport and communication

1. Movement is involved in both.
2. Means of transport can be used in both.

Difference between transport and communication

Transport	Communication
1. Deals with the movement of goods and people 2. Involves only the physical carriage of goods 3. Time is essential as the distance to be covered may be long	1. Deals with the movement of information. 2. Physical carriage of information is used. • Messages can also be sent through mobiles or computers. 3. In most case, transmission of the information is immediate.

ROLE OF TRANSPORT AND COMMUNICATION IN AFRICA

1. Transport and communication has enhanced trade.

2. Means of transport and communication influence the location of industries.

3. Transport means promote mobility of labour, thereby reducing labour shortage.

4. Promoting of international understanding by enhancing human contact.

5. Promotes development of human settlements, .e.g. roads.

6. Creation of employment opportunities.

7. Promotion of tourism worldwide.

Problems facing transport and communication in Africa

1. Colonial heritage which makes African countries to have fragmented transport links.
2. Hostile environment due to presence of severe climatic conditions like desert and heavy rainfall in equatorial regions.
3. Lack of navigable rivers
4. Political instability which leads to destruction of transport and communication facilities.
5. Wars which discourages movement through certain areas
6. Language barrier which hinders oral and written communication
7. High cost of fuel which hinders development of transport and communication.
8. Inadequate capital to establish transport and communication.

TRADE

- Trade refers to buying and selling or the exchange of goods and services for money or for other goods or services.



IMPORTANCE OF TRADE

1. Trade helps to make goods available.
2. Trade provides a variety of goods for consumers to choose from.
3. Trade promotes peace and understanding between communities and countries.
4. It provides a market for surplus goods.
5. Trade creates employment opportunities.
6. It is source of government revenue in form of taxes.
7. Trade earns a country foreign exchange.
8. It acts as a linkage between producers and consumers.
9. It enables consumers to get goods that they do not produce.

CLASSIFICATION OF TRADE

1. International trade(external trade)
2. Regional trade
3. Home trade (internal trade)

- **International trade**: is conducted beyond the borders of the country.
- **Home trade**: is carried out within country's boundaries.

Types of international trade

1. **Export trade**: is the sale of goods and services by a country to another or individuals in one country to individuals in another country.
2. **Import trade**: is the buying of goods and services by one country from another or by individuals in one country from individuals in another country.
3. **Bilateral trade**: exchange of goods and services between two countries.
4. **Multilateral trade**: exchange of goods and services between many countries.
5. **Visible trade**: trading in tangible goods.
6. **Invisible trade:** trading in services.

Balance of trade

1. **Adverse balance of payments:** imports exceed exports.
2. **Favorable balance of trade:** export exceeds import.

TYPES OF HOME TRADE

1. **Retail trade**: it involves the selling of goods and service to the final consumer at a profit.
2. **Wholesale trade**: it involves the selling of goods and services to other trader for resale.

FACTORS INFLUENCING TRADE

1. Transport
2. Communication
3. Capital
4. Supply
5. Level of industrialization
6. International market agreement
7. Taxation
8. Government policy
9. Climate
10. Minerals
11. Foreign investments
12. Population

IMPORTANCE OF TRADE TO SOMALILAND

1. foreign exchange
2. Transfer of technology
3. Employment
4. Development of infrastructure
5. Sources of revenue
6. Development of urban settlement
7. Distribution of resources
8. Stimulates the exploitation of resources

PROBLEMS FACING TRADE IN SOMALILAND

1) Scarcity of goods especially in remote areas. This makes goods expensive
2) Inadequate capital which lowers the volume of business.
3) High fees charges on traders in form of trading licenses.
4) Poor infrastructure which discourages transportation of goods
5) Imposition of trade barriers by the government which restricts importation of goods.
6) Widespread poverty which lowers the purchasing power of the people.

THE ROLE OF TRADING BLOCS IN THE ECONOMY

- A trading bloc is an association of trading nations which agree to abolish trade restriction among them in order to widen the market for goods and services in their regions

AFRICAN TRADING BLOCS

1. Common Market For Eastern And Southern Africa (**COMESA**)
2. Southern African Development Co-Operation (**SADC**)
3. Economic Community Of West African States (**ECOWAS**)

Common Market For Eastern And Southern Africa (COMESA)

- COMESA was established in December 1994.

Members of COMESA

- Angola, Burundi, Comoros, Democratic Republic of Congo, Ethiopia, Eritrea, Egypt, Kenya, Madagascar, Malawi, Mauritius, Rwanda, Seychelles, Swaziland, Uganda, Djibouti, The Sudan, Namibia, And Zimbabwe.

Aims and objectives of COMESA

1. To attain sustainable growth and development among member states.
2. To raise the standards of living of its people.
3. To foster closer relations among its members.
4. To co-operate in the promotion of peace and security among its members.

Achievements of COMESA

1) COMESA has led to a more reliable transport and communication infrastructure.
2) There is more emphasis on regional exploitation of natural resources.
3) It has increased agricultural production and food security in Africa.
4) It has increased productivity among the member states.

Southern African Development Co-Operation (SADC)

- The Southern African Development community (**SADC**) has been in existence since 1980.

Members of SADC

- Angola, Botswana, Lesotho, Malawi, Mozambique, Tanzania, Swaziland, Zambia and Zimbabwe.

Aims of SADC

1. To reduce the dependence of the region on the outside world.
2. To promote and co-ordinate regional co-operation in development projects.
3. To mobilize resources in the region in order to uplift the standards of living of the people of the member states.
4. To foster international co-operations.

Achievements of SADC

1) **SADC** has reduced the dependence of the southern African states on Europe and America.
2) **SADC** has promoted and coordinated the development of infrastructures.
3) **SADC** has expanded the market for goods of the member states.
4) **SADC** holds trade fairs and exhibitions within its region and participate other regions.

Economic Community Of West African States (ECOWAS)

- **ECOWAS** was established in 1975 by sixteen West African states.

Members of ECOWAS

✓ Gambia, Mali, Cape Verde, Liberia, Niger, Benin, Togo, Burkina Faso, Mauritania, Ivory Coast, Sierra Leone, Ghana, Senegal, Guinea, Nigeria And Guinea Bissau.

Aims of ECOWAS

1. To eliminate trade restrictions among member states.
2. To impose uniform tariffs in all imports from non-member states.
3. To give special treatment to goods imported from member states.
4. To promote free movement of people from one member country to another.
5. To uplift the living standards of the people in member states.

Achievements of ECOWAS

1) **ECOWAS** has helped to foster peace in member states.
2) The member states enjoy special taxes for goods imported among them.
3) Notable development has taken place for **ECOWAS** members in transport, communication, agriculture and trade.
4) It has widened the marketing of goods from member states.
5) There is free movement of people from one state to another.

Problems facing regional trading blocs

1. Civil war taking place in some countries which has caused insecurity.
2. Political difference among leaders of member states.
3. Some countries produce similar goods.
4. Free trade affects local industries as the imported goods are cheaper.
5. Free trade denies country's revenue
6. Poor transport and communication limits inflow of goods.

CHAPTER 4: POLITICAL GEOGRAPHY

- **Political geography** is a branch of human geography that studies the existing, distribution of political processes and how these processes are impacted by ones geographic location.

- **Government:** is an organization of people set up to protect the community and make rules.

- **WHAT DOES A GOVERNMENT DO?**

- Protects the community
- Makes laws
- Keeps order

- **WHY DO PEOPLE NEED GOVERNMENT?**

- For protection of people and property
- Making rules
- Enforcing laws

- **FORMS OF GOVERNMENTS**

1. Monarchy
2. Dictatorship
3. Aristocracy
4. Democracy
5. Democratic republic

1- **Monarchy**: consists of rule by king or queen and sometimes a king is called an **emperor** especially if there is a large empire.

- The UK, which has a queen, is really a republic because the queen has virtually no political power.

2- **Dictatorship**: consists of rule by one person or a group of people.

- The dictator may be one person, such as **Castro** in **Cuba** or **Hitler** in **Germany**, or a group of people, such as the communist party in **China**.

3- **Aristocracy**: is system of government ruled by the wealthy, educated people.

4- **Democracy**

- The word **democracy** is derived from the **Greek** word '**demokratien**'.
- '**Demo**' means people; '**kratien**' means to rule.
- **N.B.** all democracies are really republics.
- In a republic, the people elect representatives to make and enforce laws.

5- **Democratic republic**

- Usually, a democratic republic is not democratic and is not republic. A government that officially calls itself a democratic republic is usually a dictatorship. Communist dictatorships have been prone to use this term. For example, the official name of North Vietnam was 'the democratic republic of Vietnam.'' China uses a variant, "the people's republic of China. **Siyad barre** also used "the democratic republic of Somalia."

OTHER FORMS OF GOVERNMENT

1. **Cabinet government**: a system of government where the cabinet is the central policy-making body.
2. **Parliamentary government**: a political system where parliament is a central feature. Government is elected from parliament and is accountable to parliament.
3. **Coalition government**: two or more parties take part.

TYPES OF COALITION

A. **Majority coalition**: normally formed by just two parties, such coalitions are formed simply to create a parliamentary majority.
B. **Grand coalition**: these are coalitions between two major parties, formed to create an overwhelming majority.
C. **Rainbow coalition:** these are agreement between a large numbers of parties, often of great varying philosophy.
D. **National coalition:** these are coalition where all parties are invited to participate.

WAYS OF EXERCISING DEMOCRACY

1. **Direct Democracy (Pure Democracy)**: this is an exercise of democracy, which all citizens without the intermediary of elected officials, can participate, in decision-making process.

- Such type of democracy is feasible only in relatively small number of people in community, organization, tribal council or local unit of labor.

2. **Indirect Democracy (Representative Democracy**): citizens elect officials to make political decisions, to formulate laws and to administer programs for the public good.

PILLARS OF DEMOCRACY

1) Sovereignty of the people.
2) Majority rule coupled with minority rights.
3) Guarantee of basic Human Rights.
4) Free and fair elections.
5) Rule of law.
6) Constitutional limit on government.
7) Equality before the law.

KINDS OF DEMOCRACY

1) **Political Democracy**: it is a system of government which people govern themselves, criticizes leaders of their government and chooses new ones in an election.
2) **Economic Democracy**: in democracy system, every person has the chance to improve his or her economic standing. Economic democracy is also called **free enterprise**.
3) **Social Democracy**: it is sometimes called social equality. It gives all citizens equal rights under the law. All laws apply equal to all citizens regardless of their birth, wealth, race, religion, sex….etc.

THE RESPONSIBLE BODIES OF DEMOCRACY

1) Obligation of citizens.
2) Obligation of government.
3) Role of education

CHALLENGES OF DEMOCRACY

1) Civic neglect.
2) Economic depression.
3) Bureaucracy (**system for managing a country**).

ELECTIONS

- Elections are means of making political choices by voting.

ELECTORAL MANIFESTO

A statement produced by a political party at election times, stating what policies it intends to implement if it gains power.

CHARACTERISTICS OF DEMOCRATIC ELECTIONS

1) Are **competitive**: opposition parties and candidates must enjoy the freedom of speech, assembly and movement to voice their criticisms of the government openly and bring alternative policies and candidates to voters.

2) Are **periodic**: peoples elected as chief decision-makers and representatives are not elected for life. The term of office of an elected agent ought to be limited.

3) Are **definitive**: elections determine the leadership of a government. Any election is not limited in selecting candidates, it also includes policy issues.

4) Are **inclusive**: everyone who has the right to vote must take part the elections.

ESSENTIAL CHARACTERISTICS OF FREE ELECTIONS

1. Regular elections
2. Meaning full of choice: citizens must have alternative candidates.
3. Freedom to put forth candidates.
4. Freedom to know and discuss choices.
5. Universal adult suffrage.
6. Equal weight of votes.
7. Free choice of candidates.
8. Accurate counting of votes and reporting results.

THE NATURE OF THE VOTING

1) **Plurality voting:** the winner needs only the highest number of votes.
2) **Simple majority voting:** the winner needs more than 50% of the vote.
3) **Extra-ordinary majority voting:** the winner needs to get **two-third-vote**.

QUALIFICATION FOR VOTING

1- Citizenship
2- Age
3- Residence
4- Registration

STATE

- The **state** is a collective name for the institutions that administer a country.

FORMS OF STATES

1- Unitarism
2- Federalism

1. Unitary form of state

In a unitary system of government, there is only one central authority responsible for all the functions and whose decisions are final.

2. Federalism

In this arrangement, there are at least two levels of government, one central and one regional.

- **Federalism**: is a process of combining several states into one political order without any of the individual states losing its geographical area or other forms of identity.

THE STRUCTURE OF SOMALILAND GOVERNMENT

1. The executive (**fulinta**).
2. The legislature (**sharci-dajinta**)
3. The judiciary (**garsoorka**).

THE EXECUTIVE (FULINTA)

- The executive branch sometimes refers the government.
- The executive consists of the president, the vice-president, the cabinet ministers, and the members of executive council (MEC).

- The **responsibility** of the executive **is to run the country** and to make policy in the best interests of its citizen and in terms of constitution.
- The executive **cannot pass** the law but may propose to the legislative new laws and change to existing laws

THE STRUCTURE OF EXECUTIVE

THE PRESIDENT

- The president is the head of state and head of national executive or cabinet.
- He or she is entrusted with maintaining the supremacy constitution as the guiding law of the country.
- The unity and interest of the nation as head of the state; president is also the commander in chief of defenses'.

ELIGIBILITY FOR ELECTION AS PRESIDENT OR VICE PRESIDENT

- He must be a citizen of Somaliland by the birth and not with-standing residence as refugee in another country ,must be not hold any other citizen ship
- He must be Muslim and must have accordance with Islamic religion
- He must not be aged less than 40 years
- He must be physically and mentally fit to fulfill his duties
- He passes knowledge and experience In management
- He must not have been convicted by a court
- His spouse must be Muslim
- Having been resident in the country for a period at least 2 years before election

DURATION OF THE PRESIDENT

- A person may serve as president for no more than **two terms**.

REMOVAL OF THE PRESIDENT

- If the president is found to have seriously violated constitution or the law, or has been engaged in serious misconduct or unable to run his or her duties, the national assembly may remove from (**two third**) of all the members would have to agree this motion of no confidence in the president (he is not governing the country satisfactory).
- It requires only **majority over 50%**.
- The president, the vice, cabinet, deputy ministers, would have to resign.

ACTING PRESIDENT

- If the president is out of the country or unable to perform his or her duties, the following people in order of the priority are required to serve as acting president.
- The deputy president
- Minister designated by president
- The speaker of the national assembly.

THE POWERS OF THE PRESIDENT

- Appointing and removal of cabinet ministers.
- Appointing the public protector auditors.
- Calling special sitting of the houses of parliament
- Calling national referendum
- Receiving foreign diplomats
- Pardoning offenders
- Declaring a state of national defense (**with approval parliament**).

ELECTION PROCEDURE

1- The president and vice president should be elected jointly through a direct general election by means secret ballot.

2- The joint election of the president shall be based on the list system and shall take a month before the end of the term

3- Outgoing president and vice president shall continue in office until the new president and vice president assume their office within a month.

4- The two candidates in which obtain the highest number of the votes in the presidential and vice presidential election shall be recognized as successful candidate

5- if on the expire of term of office of the president and vice president is not possible to hold because of security, the house of elders shall extend their terms of office while its taking to consider the period in which their problem can overcome and election can be held.

THE MATTERS OF WHICH PRESIDENT AND VICE-PRESIDENT ARE ALLOWED

- The president and vice president and their spouses shall not engage any business activity during their term of office.
- The president shall not be absent the country for period exceeding **45** consecutive days unless the absence is for reason of health.
- All presents given, as much of respect of their office, to the president, and vice president and their spouses and the senior office of the nation who have national standing shall be the property of the nation.

VACANCY OF THE OFFICE OF PRESIDENT AND VICE-PRESIDENT:

1. conviction of crime
2. in ability to fulfill his duties due to ill
3. Death

POWER OF THE VICE-PRESIDENT

- The vice president of the nation shall have the powers :
- To act as president in the absence or illness of the president
- To undertake such duties as delegated to him by president
- To act as president because of the resignation of president
- The conviction of president for crime or lose office
- Death

THE COUNCIL MINISTERS

- The council of ministers shall assist in the fulfillment of his duties
- Ministers and deputy ministers shall be appointed or dismissed by president
- Shall be sworn by chairman of supreme court
- No person who cannot fulfill the condition necessary for election to the house of representatives shall be appointed as ministers or deputy minister
- Ministers or deputy shall not hold any other occupation

THE LEGISLATURE (SHARCI-DAJINTA)

Somaliland has bicameral or hybrid legislative system which are:

1- **The house of representatives**
2- **The house of elders**

- The house of representative is elected and is the main legislative.
- The first direct election of the House of Representatives took place in **September 2005,** three political parties control seats.
- **Both houses** consist of **82 members** each but the house of elders also includes honor who are either former of holders of offices of president, vice president or speaker of both houses.

STANDING FOR THE HOUSE OF REPRESENTATIVES

- He must be citizen.
- He must be Muslim.
- He must not be aged less than **35**.
- He must be physically and mentally able to fulfill his duties.
- He must be educated at least secondary level.
- He must be a responsible person.
- He must have not been sentenced.
- He must pay candidate deposits.

THE POWER OF REPRESENTATIVES

- **To pass all legislation** together with the house of elders:
- Presidential appointment is approved by representatives over straight of government policy.
- Decision about states of emergency.
- Impeachment powers.

STANDING COMMITTEES OF THE HOUSE OF REPRESENTATIVES

- Permanent committee.
- The economic and finance and commerce committee.
- The social and religious affairs committee.
- The environment, agriculture, livestock and natural resources committee.
- The internal affairs, security and defense committee.
- The foreign affairs, international cooperation and national planning.
- The constitution, justice and human right committee.

THE JUDICIARY (*GARSOORKA*).

- The state shall have judicial branch whose function is to educate on proceeding between the government and the public and between various members of the public.
- The judicial branch shall be independent other branch shall fulfill its duties in accordance with a constitution and shall be independent other branches of state.
- The judiciary shall have the power to interpret in accordance with the constitution law passed by constitution bodies.
- Adjust on the dispute between government bodies and between public and between members of public.

THE INDEPENDENCE OF THE JUDICIARY:

1. If judges are not independent there is a danger that the government will exceed its powers without legal justification.
2. It may suit government to discriminate against individuals or groups in society for its own benefits. An independent judiciary can prevent such discrimination.

N.B: all judges must be selected on a neutral basis to prevent collusion between the judiciary and the government.

JUDICIAL NEUTRALITY:

1. The principle that members of the judiciary should avoid allowing their political ideas to affect their decisions in cases.
2. It also implies that judges should not show any systemic bias towards or against any groups in society

TYPES OF COURT IN SOMALILAND

1- First instance court (district court and regional)

2- The appeals court

3- The supreme court (constitutional court)

4- Military court

DISTRICT COURT

- the district court deals with all claims based on sharia which are primarily matters relating to family and succession, they also deals with civil litigation concerning for amount up 3 million $482 and criminal cases punishable by imprisons for up to 3 years

REGIONAL COURT

- The general section of this court deals with crimes punishable by imprisonment for period between 3 to 10 year which is head by a regional judge.

APPEAL COURT

- The appeal court with all appeals from district and regional court and is divided

THE SUPREME COURT (CONSTITUTIONAL)

- It is the highest judicial organ in the country and comprised of the chairman and at least four judges.

✓ **The supreme court deals with**

- All appeals from appeal court
- Jurisdictional issues between the courts of land
- Declaration of general elections result (presidential and parliamentary)
- Decisions on any complaint relating to election

APPOINTMENT OF THE CHIEF OF JUSTICE IN SOMALILAND.

- The chief justice is **appointed** by **presidents** in constitution with judicial commission.
- The appointment must be confirmed at joint the sitting of both houses of parliament.
- The **president may dismiss** the **chairman** of the **Supreme Court subject to the approval** both houses.

CHAPTER 5: POPULATION

- **Population** is the total number of people occupying an area.
- **Population distribution:** this refers to the way people are spread out on the land.
- **Population density:** is the concentration of people in a specific area or
- **Population density:** number of people living per unit area (**kilometer squares**).

- **Methods of calculating population density**

1. **CPD =** $\frac{total\ population}{total\ area}$

✓ **CPD =** crude population density.

2. **APD =** $\frac{total\ population}{total\ arable\ area}$

✓ **APD =** agricultural population density

- **Example:**

- Assume the total area of the world is 149.45 km^2 and its arable area is only 11% and the world's population in 1990 was 5292 million. **Calculate**.

a) Crude population density.
b) Agricultural population density.

- **SOLUTION**

given	Crude population density.	Agricultural population density.
• **Total population =** 5292million. • **Total area =** 149.45 km^2. • **Arable land =** 11**%** of 149.45= 16.4	**CPD=** $\frac{total\ population}{total\ area}$ **CPD=** $\frac{5292million}{149.45\ km^2}$ **CPD=** 35 person **per** km^2	**APD=** $\frac{total\ population}{total\ arable\ area}$ **APD=** $\frac{5292million}{16.4\ km^2}$ **APD=** 322 person **per** km^2

DESCRIBING POPULATION DENSITY

- Unpopulated area if **CPD** is less than 1 person **per** km^2.
- Sparsely populated area if **CPD** is between 1 to 20 persons **per** km^2.
- Moderately populated if **CPD** is over 100 persons **per** km^2.

FACTORS INFLUENCING POPULATION DISTRIBUTION

1. Physical factors
2. Historical factors
3. Economic factors
4. Political factors

1. PHYSICAL FACTORS

a) Climate: areas which receive high rainfall are rich in agricultural resources thus they can support a large population. The dry areas have sparse populations because of their low agricultural potential. Very high temperature also discourages human settlements.

b) Relief: areas of very high altitude have low population because of the extremely low temperatures experienced there.

c) Vegetation: dense forests are sparely populated as it is difficult to develop communication lines. They are also habitats for wild animals which may be danger to human habitation, livestock and crops.

d) Soils: areas with fertile soils and reliable rainfall have high population because they are agriculturally productive while those with poor soils e.g. savannah with leached soils have low population since they are agriculturally unproductive.

e) Drainage: well drained areas attract settlements and therefore have high populations.

f) Pests and diseases: Human beings require a healthy environment, without pests and disease. Places with high incidences of malaria are sparsely populated.

2. HISTORICAL FACTORS

- In the **18th century**, many part of East, west and central Africa were affected by slave trade. Strong young man and women were captured and sold as slaves to go work on the farms in America. Some were taken as slaves to the Arab world. Meanwhile, other people ran away from the same areas avoiding being captured and never returned. This reduced in the populations in these areas.

3. ECONOMIC FACTORS

- Economic development results from activities such as exploitation of natural resources attracts a large population of job seekers and service providers. Mining centers no matter how remote they may be in a country usually attract a large population.

4. POLITICAL FACTORS AND GOVERNMENT POLICIES

- Political unrest in many parts of the world has caused migration from certain areas. For example, many people from Somalia and other countries in Africa have sought refuge in many parts of the world in recent years because of political instability.

POPULATION GROWTH

- It refers to the increase (**positive growth**) or decrease (**negative growth**) of number of people.

CAUSES OF POPULATION GROWTH

A) Fertility

- **Fertility** is the ability to produce.
- **Fecundity:** refers to the ability to give birth to many children, i.e. high fertility.
- When this condition is **lacking**, it is referred to as **infecundity** or **infertility**.
- **High** fertility rate causes high population growth.
- **Low** fertility rate tends to decrease population growth.

$$\text{CBR}=\frac{total\ births\ in\ a year}{total\ population}\times 1000$$

CBR= crude birth rates.

CAUSES OF HIGH FERTILITY RATE

1. Early marriage
2. Polygamy
3. Improvement in nutrition and dietary habit.
4. Availability of health facilities.
5. Sex-preferences.
6. Customary practices

CAUSES OF LOW FERTILITY RATE

1. Provision of education opportunities to girls.
2. High cost of living which necessitates small families.
3. Low standard of nutrition and poor diets.
4. Increased number of single women.
5. Modern career opportunities.
6. Use of birth control measure

B) Mortality rate

- ✓ **Mortality rate** is the number of deaths within a given population.
- ✓ The **death rate** is the number of deaths per one thousand of the total population per year.

$$\text{CDR}=\frac{total\ number\ of\ death\ in\ a year}{total\ population}\times 1000$$

CDR= crude death rates.

- ✓ **Children mortality rate** refers to the number of deaths of children aged between **1** and **5** years per one thousand **live** births.
- ✓ **Infant mortality rate** refers to the number of deaths in the **first year** of life per one thousand **live** births.

➡ **FACTORS INFLUENCING INFANT MORTALITY RATE**

1. **Age of the mother**: the mother's age may determine the level of knowledge about raising babies, food to eat, detection of diseases and finding adequate time to be with the baby.
2. **Birth interval**: chances of a baby dying are higher for children who are closely spaced than those with a big interval between them.
3. **Status and income of the mother**: mothers with higher income will tend to provide better care for their children than those with little or no income.

➡ **MEASURES TO CONTROL INFANT MORTALITY**.

1. Improving immunization of children to control diseases at an early age.
2. Providing more education opportunities for the mother to improve her skills and understanding in child development.
3. Improving the general conditions of the mother by reducing poverty so as to enable the mother to have access to a good diet for the baby.

➡ **Adult mortality rate** refers to the number of adults dying per one thousand of the total population.

- Mortality is important because it reduces the population in a given area.
- High mortality rate leads to low population growth

CAUSES OF HIGH MORTALITY RATE

1. Low nutritional standards and hygiene which causes childhood diseases.
2. Natural calamities, e.g. droughts, floods and earthquakes.
3. High crime rate e.g. war and other forms armed conflicts.
4. Outbreak of epidemic diseases, e.g. Ebola.
5. Place of residence, e.g. death rate is higher in urban areas due to high crime rate

LIFE EXPECTANCY

- This refers to the number of years that one is expected to live.
- Life expectancy is an indicator of development.
- High life expectancy is found in developed countries while developing countries have low life expectancy.

RATE OF NATURAL INCREASE

- The rate of natural increase is obtained from the difference between the death rates and birth rates. It is expressed as percentage (**%**).
- This excludes all forms of migration

☞ **Rate of natural increase =** $\frac{crude\ birth\ rate - crude\ death\ rate}{1000} \times 100\%$

- **Example:**
  - ✓ India's crude birth rate is **23.8**, and the death rate is **8.4** per thousand people. Calculate India's natural increase.
  - ✓ **Solution.**
- **Rate of natural increase=** $\frac{crude\ birth\ rate - crude\ death\ rate}{1000} \times 100\%$
- **Rate of natural increase=** $\frac{23.8 - 8.4}{1000} \times 100\%$
- **Rate of natural increase=** $\frac{15.4}{\cancel{1000}} \times \cancel{100}\%$
- **Rate of natural increase =** $\frac{15.4}{10} \times \%$
- **Rate of natural increase = 1.54%**

C) MIGRATION

- **Migration** is the movement of people from one place to another resulting in a change of residence
- This movement may be **temporary** or **permanent**.
- **Migrants:** these are people taking part in migration, either moving into an area or leaving an area.
- **Immigration**: where people come into a country from other country.
- **Emigration**: where people leave their native land for another country.

✓ Migration across the country's borders is called **international migration**.

CAUSES OF MIGRATION

1. Availability of land.
2. Availability of employment opportunities.
3. Creation of wealth.
4. Search of religious and political freedom.
5. Wars.
6. Natural calamities.
7. Government policy

TYPES OF MIGRATION

1. **Internal**
2. **External**

(a) INTERNAL MIGRATION

✓ This is the movement of people within a country.

1. Rural to urban migration

- Young people form the majority of migrants in this category because they move to towns in search of jobs after reaching various levels of education.
- The low price paid for cash crops force some people to abandon farm work and seek alternative sources of income in the urban areas.

RURAL TO URBAN MIGRATION IN *LEDCs*: *PUSH AND PULL FACTORS*

PUSH FACTORS FROM RURAL	PULL FACTORS TO TOWNS.
1. Land shortage due to population pressure.	**1)** Prospects of a higher standard of living
2. Unemployment in agriculture.	**2)** More opportunities in jobs.
3. Poverty and crop failure.	**3)** Higher wages in urban jobs.
4. Debt in rural areas, especially among tenant farmers.	**4)** Less interest on loans.
5. Natural disasters.	**5)** Fewer natural disasters.
6. Poor medical facilities.	**6)** Better medical facilities.
7. Lack of educational opportunities.	**7)** Greater number and better quality of schools.
8. Poor transport, housing, water, electricity, and sewage disposal.	**8)** Prospect of better services.
9. Traditional way of life with limited social facilities for young people.	**9)** Attraction of the bright lights of the city.
	10) Media, entertainment, television and radio are all more accessible.

2. Rural to rural migration

- People may move into plantation and other large farms seeking employment.

3. Urban to rural migration

- People may be transferred from their places of work in towns to go and work in the rural areas.
- Where industries are set up in the rural areas, some people may go searching for employment in these industries.

4. Urban to urban migration

- People may move from one town to another in search of better employment or business opportunities.
- Some workers are transferred by their employers to go and work in other towns.
- It should also be noted that inter-urban migration occurs when people move from one part of the town to another.

(b) EXTERNAL MIGRATION

✓ This is the movement of people from their own countries to other countries.

✓ This migration is also referred to as international, inter-state or inter-regional.

EFFECTS OF POPULATION GROWTH.

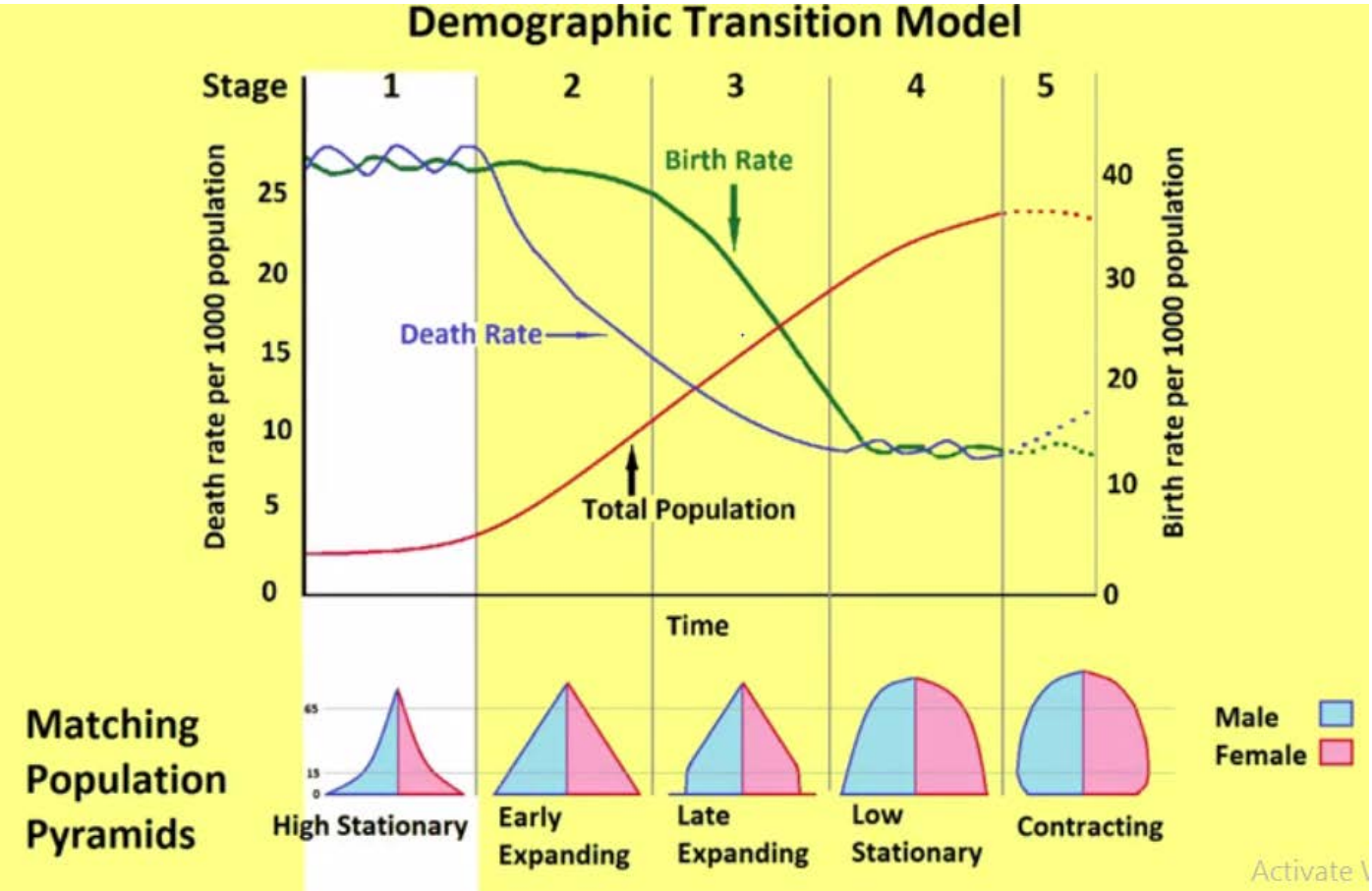
(a) Positive effects

1. Large population provides large manpower.
2. Large population provides market which stimulates agricultural and industrial development.
3. Large population leads to rapid urbanization and increased modernization.
4. Large population may lead to technological innovation.

(b) Negative effects

1. Large population leads to pressure on land.
2. Population pressure may lead to destruction of forested areas to pave away for human settlement.
3. Large population leads to over exploitation of natural resources.
4. Large population leads to unemployment and increased crime rate.
5. The government spends a lot of money in provision of social services.

DEMOGRAPHIC TRANSITION THEORY



Stage1:

- High birth rate and high death rate
- Little or no increase in population

Stage2:

- High birth rate and decline in death rate.
- High population growth rate.

Stage 3:

- Low death rate and declining birth rate
- Moderate population growth.

Stage 4:

- Low birth rate and death rate
- Low population growth rate.
- The population becomes static.

POPULATION STRUCTURE

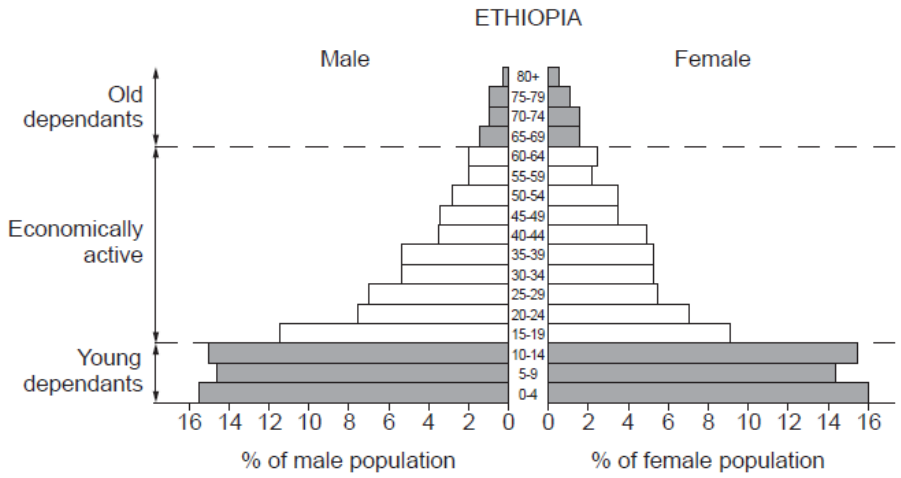
- ✓ **Population structure** refers to the composition of a given population in terms of age and sex at a particular time.
- ✓ Population structure is best understood by using population.
- ✓ Pyramids reflect social-economic well-being of the individual countries.

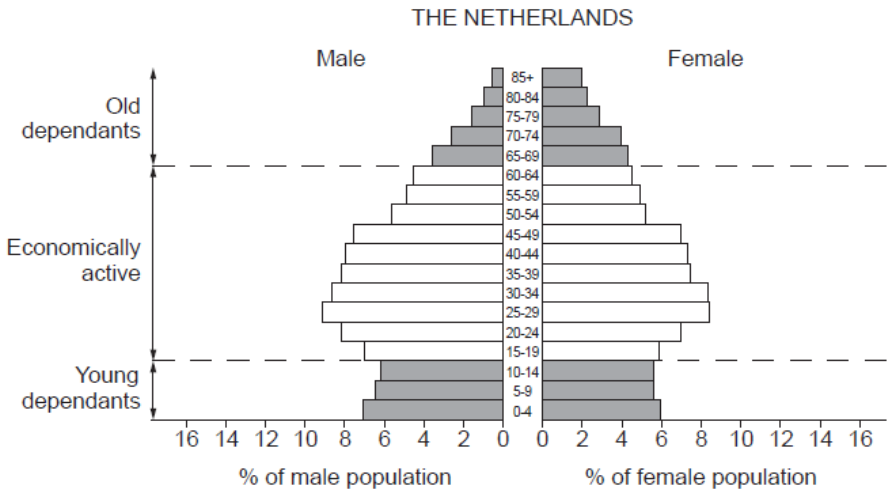
IMPORTANCE OF POPULATION STRUCTURE

1. **Planning**: the breakdown of population by age and sex helps a government to formulate policies for socio-economic development.
2. **Calculation of sex ratio**
3. **Calculation of dependence ratio**

Dependence ratio= $\frac{children(<15) + old\ people\ (>65)}{working\ population\ (15\ to\ 65)}$

- ✓ Population pyramids of **Ethiopia** (an **LEDC**) and The **Netherlands** (an **MEDC**).



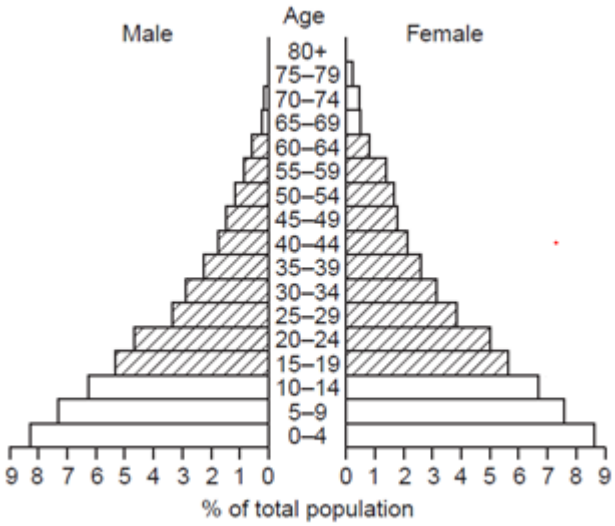


TYPES OF PYRAMIDS

1. Stationary pyramid
2. Regressive pyramid

STATIONARY PYRAMID

- It has a narrow apex and wide base.
- This pyramid is characteristic of developing countries and is said to be a youthful population.

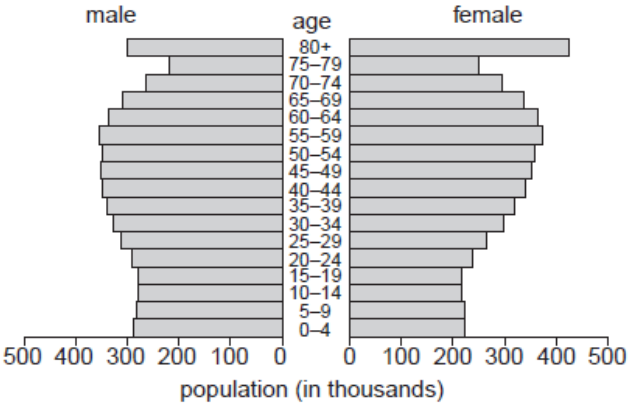


CHARACTERISTICS

- High number of youth.
- High birth rate.
- Narrow top, meaning low life expectancy.
- High death rate.
- The dependency ratio is high due to the high number of dependants who are mainly the youth.
- Difficult economic development i.e. more money is spent on maintaining dependants.
- Large labour force.

REGRESSIVE PYRAMID

- It has a narrow base and wide at the top.



CHARACTERISTICS

- Low number of youth.
- High number of aged people.
- High life expectancy.
- Low death rate.
- The aged lead to an increase in the number of dependants.
- However, when compared to the stationary pyramid, it has a lower dependency ratio.

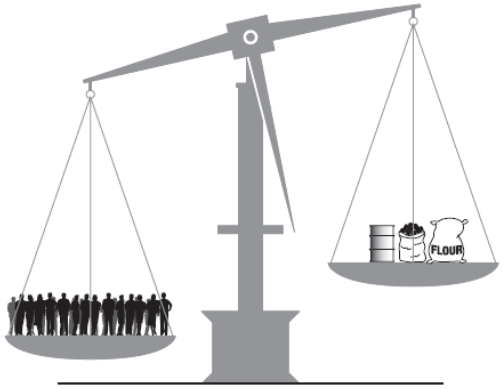
OVER-POPULATION AND UNDER-POPULATION

(a) OVER-POPULATION

- Overpopulation is a situation whereby a country has a high population that it cannot be supported fully due to a strain on the available resources.
- The change in population growth is called demographic trends or population trends.

PROBLEMS OF OVER-POPULATION

1. Underdevelopment.
2. Unemployment.
3. Poor housing and health facilities.
4. Underutilization of agricultural resources.
5. Slow industrial growth.
6. Increased bias in traditional attitudes
7. Reduction in cash crops.



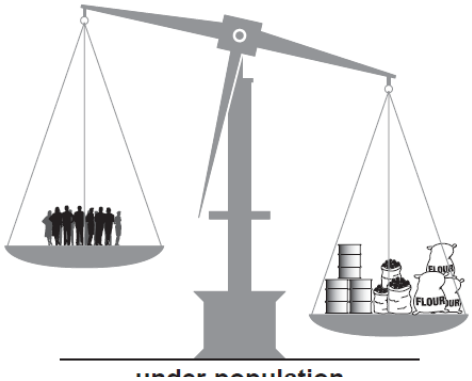
over-population

(b) UNDER-POPULATION

- Under-population is a situation whereby there are too few people to fully develops the economic potential of a nation.

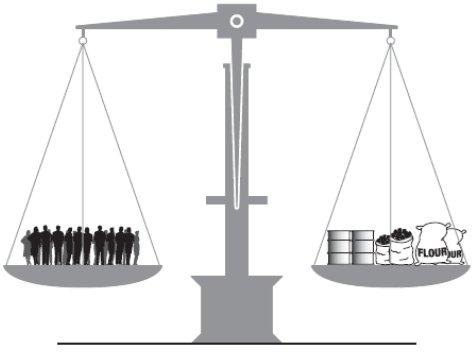
PROBLEMS OF UNDER-POPULATION

1. Uneven distribution of population
2. Scarcity of services.
3. Underutilization of resources.
4. Shortage of labour
5. Inadequate market.
6. High transport cost.
7. Slow economic development.



OPTIMUM POPULATION

- Uniform distribution of population.
- Balanced resources.
- Adequate market.
- Well-developed economic sector.
- Employment opportunities.
- Highly utilization of agricultural resources.



optimum population

CHAPTER 6: MINING

- **Mining** is the process of extracting valuable minerals from the earth's crust.
- **Minerals** are inorganic substances composed of chemical elements.

- ***GCSE 2017, Q18, Page 6***

1. Inorganic substances which are composed of chemical elements **are** called.

a) Mining
b) Mineral
c) Alluvial
d) Fossils

TYPES OF MINERALS

1. **Metallic**: e.g. Gold and aluminum.
2. **Non-metallic**: e.g. graphite and sulphar.
3. **Energy minerals** or **fossil fuels**: includes petroleum, coal and natural gas.

- ***GCSE 2010, Q14, Page 5***

1. Which of the following is a metallic mineral:

a) Aluminium.
b) Sulphur.
c) Asbestos.
d) Potash.

CHARACTERISTICS OF MINERALS

1- It must be crystalline solid.
2- It must occur naturally.
3- It must be inorganic.
4- It must have a definite chemical composition.

- ***GCSE 2019, Q18, Page 6***

1. Which one of the following **does not** include the characteristics of minerals

a) Crystalline
b) Occur naturally
c) Must be inorganic
d) Organic content

FACTORS AFFECTING OCCURRENCE OF MINERAL

a) Weathering.
b) Alluvial deposit.
c) Oil pools or wells
d) **Beds, layers and seams:** occurrence of mineral as sedimentary layers.
e) **Reefs**-- **veins** and **lodes**: which are exposed on the surface.

I. **Veins**: when mineral occurs in small quantity.
II. **Lodes**: those that occur in large quantity.

- ***GCSE 2018-RE-EXAM, Q13, Page 5.***

1. Occurrence of minerals as sedimentary or as a result of compression of accumulated organic or inorganic material which form layer of deposition is:

a) Beds, layer and seam
b) Reefs
c) Weathering
d) Alluvial

CONDITIONS NECESSARY FOR FORMATION OF PETROLEUM

1- Presence of organic remains

2- **Presence of sedimentary rock** of burying organic remains.

3- **Presence of pressure** to compress organic remains.

4- **Presence of a porous reservoir rock** to store and transmit petroleum to the oil pools.

5- **Presence of a trap-like or syncline** to hold petroleum in a reservoir to prevent its escape.

6- **Presence of impermeable rocks** below the trap or syncline to prevent petroleum from percolating further underground.

- ***GCSE 2017, Q7, Page 8***

1. State the **conditions** necessary for formation of petroleum? (**6 marks**)

- ***GCSE 2019, Q8, Page 10***

2. Name and explain any three factors that are necessary for the formation of petroleum? (**6marks**)

- ***GCSE 2018-RE-EXAM, Q2, Page 7***

a) Describe the natural conditions under which petroleum occurs? (**3 marks**)
b) Name **three** countries that are major producers of petroleum? (**3 marks**)

FACTORS AFFECTING EXPLOITATION OF MINERALS

1. Value of the mineral
2. Size of the mineral deposit
3. The quality of the ore
4. Methods of mining
5. Transport cost
6. Political situation
7. Availability of labour
8. Demand for the mineral
9. Availability of capital
10. Effects on the environment

- ***GCSE 2018, Q7, Page 7.***

1. Determine any **three** factors that are necessary for the exploitation of minerals? (**6marks**)

- ***GCSE 2004, Q8 (a), Page 7.***

1. State any **two** factors that encourage extraction of minerals (2 marks)

METHODS OF MINING

1. Open-cast mining
2. Underground mining
3. Alluvial mining

- ***GCSE 2009, Q8 (a), Page14.***

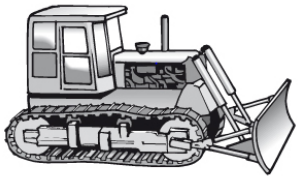
a) List any **two** methods used in mining. (2marks)

1. OPEN-CAST MINING METHODS

a) Stripping method

- Employed if mineral deposits occur very close to the earth's surface.
- Involves removing of top layers covering the mineral ore.
  - ✓ **If** mineral is **soft** it can be removed by digging.
  - ✓ **If** mineral is **hard** it can be loosened by use of explosive and removed by use of powerful bulldozers.
- Stripping methods is employed on such minerals as copper, iron and coal.

b) Hill slope boring



- Involves extraction of ore outcrop deposits in hill slopes.
- Drilling is done to reach deposits deep in the slope.
- Drilling instrument called auger is used to remove the ore.
- Main mineral removed using this method is coal.

NEGATIVE EFFECTS OF OPEN CAST MINING

1. The land is left with gapping and becomes ugly
2. The heaps of rock waste hinder any form of land use
3. The dust produced during the mining pollutes the atmosphere and is a health hazard.
4. Large scale blasting of rocks leads to earthquake.
5. Open mines, when filled with water, become a health hazard by providing breeding grounds for mosquitoes and snails.
6. It interferes with natural vegetation.

- ***GCSE 2008, Q5, Page 3.***

1. Which one of the following methods is used to mine **Limestone** in **Somaliland**?

a) Deep shaft method

b) Panning method

c) Open cast method

d) Dredging method

2) UNDER GROUND

- Involves extraction of minerals covered by great thickness of rock.
- The mode of occurrence of the mineral deposit will determine the type of underground mining to be employed.

TYPES OF UNDERGROUND MINING

a) Adit method
b) Shaft method
c) Solution method
d) Drilling method

a) Adit method

- Used to extract minerals found in horizontal seams in slopes.
- Horizontal tunnels called **adits** or **drifts** are cut into the mineral bearing layer for extraction of ore.

b) Shaft method

- Apply where mineral occur in vertical seams.
- Vertical cannels called **shafts** are sunk until mineral ore is reached.
- The mined ore is lifted and loaded into the trucks

Problems associated with shaft mining

- Collapsing of mines causing death of miners
- Diseases due to inhaling of dust
- Flooding due to underground water.
- Poisonous gasses
- Suffocation due to lack of enough oxygen
- High temperatures due to increased depth

c) Solution method

- Apply where mineral dissolves into water.
- Superheated water is sunk into deposits of salts, potash and sulphur.
- Solution is pumped to the surface where it is evaporated and extracted the solid.

d) Drilling method

- Apply on deposits if petroleum or natural gas.
- Deposits are reached by sinking wells.
- The product is then pumped out or reach surface by own pressure.

3) ALLUVIAL MINING

- This is where the mineral ore is found along the beds of rivers mixed with sand.
- Valuable minerals are separated from the alluvial materials.
- The minerals include gold, tin and platinum.

TYPES OF ALLUVIAL MINING

a) Panning
b) Dredging
c) Hydraulic mining
d) Sub-marine mining

a) **Panning**

- It involves digging a mixture of sand, gravel and mineral from the river bed.
- Putting it in a pan and rotating the pan while tilted.
- The lighter sand or gravel is washed on the side leaving the heavier mineral at the bottom of the pan e.g. gold mining in **Migor**.

b) **Dredging**

- A dredger scoops waterlogged alluvium from the bed of a lake.
- The alluvium is passed over sloping channels with series of traps.
- Wastes are washed away and denser materials are left at the bottom of the trap e.g. mining of soda ash at **L. Magadi**.

c) **Hydraulic mining**

- This method is used when deposits occur on a valley side.
- A powerful jet of water is directed to the deposit
- Gravel and minerals collects at the valley because of the great pressure.
- The mineral grains are recovered and washed out.

d) Sub-marine mining

- Is the extracting of minerals in alluvial deposits lying deep down the ocean floor.
- A sub-marine dredger goes down to the ocean floor and scoops mineral deposits and rises to the surface.
- The alluvial is passed over sloping channels with series of traps
- Wastes are washed away and denser materials are left at the bottom of the trap.

- ***GCSE 2017, Q1, Page 10.***

1. Explain the types of alluvial mining? (**10 marks**)

- ***GCSE 2019, Q20, Page 6.***

2. which of the following **does not** include the types of alluvial mining

a) Panning
b) Dredging
c) Electrifying
d) Hydraulic mining

EFFECTS OF MINING ON THE ENVIRONMENT

1. Wastage of agricultural land
2. Pollution from harmful substances.
3. Loss of biodiversity – plants and animals.
4. Soil erosion.
5. Landslides

- ***GCSE 2008, Q2, Page 15, part 3.***

1. Discuss any **five** negative effects of mining on the environment (**10 marks**)

- ***GCSE 2011.***

2. State **two** effects of mining on the environment. (**2 marks**)

SOLUTIONS TO THE PROBLEMS OF LAND DERELICTION

- Mining companies must rehabilitate mining areas of exhaustion of minerals.
- Reclamation – government should reclaim the land back to its original status.

USES OF THE RECLAIMED LAND

- Industrial setup
- For human settlement
- For agricultural practices
- As a tourism attraction site

DISTRIBUTION OF MINERALS IN EAST AFRICA

1. **Phosphates** used in the manufacture of fertilizer- Torero in Uganda and Majingu in Tanzania.
2. **Limestone** used in cement manufacturing- Hima in N.W Uganda, Tanga in Tanzania, Athi River and Bamburi in Kenya.
3. **Fluorospar** a source of fluorine used in chemical industries- Kerio valley in Kenya.
4. **Common salt** used for consumption- Kilifi and Magadi in Kenya and L. Kitwe in Uganda.
5. **Diatomite** used in making insulatrs- Kariandusi near Gilgil and Gicheru in Nyandarua.
6. **Diamond** used to make jewellery- Mwadui in Tanzania.
7. **Titanium** used in the manufacture of insulators for aircraft- Kwale district
8. **Gemstone-** near Voi and Mwatate
9. **Soapstone** used for sculpture- Tabaka in Kisii
10. **Copper** used to make electrical wires and coins- Kilembe in Uganda
11. **Gold** used to make medals and jewellery- Musoma in Tanzania, Kakamega and Migori in Kenya.
12. **Coal** used in smelting of iron and generation of electricity- Kivira Songwe in Tanzania.

DIAMONDS IN SOUTH AFRICA

- Occur as diamond crystals. Mined by **underground** or **alluvial mining** method.

Processing

- Blasting of rock ore and lifting it to the surface.
- Crushing into small pieces and washing.
- Putting in solution together with the waste and the dirt is washed.
- Diamond and remaining rock waste is passed on greased rotating table.
- The diamonds stick on the grease while the waste rock rolls off.

PROBLEMS FACING DIAMOND MINING IN SOUTH AFRICA

- Fluctuation in world market prices.
- High cost of mining and processing of diamond reducing income.
- Exhausting and depletion of diamond reserves threatening economy.
- Inadequate labour due to competition with other sectors limits exploitation.

Contribution of diamond mining to the economy of South Africa

1) Employment opportunities
2) Earning foreign exchange after exportation to foreign countries.
3) Development of infrastructure to facilitate transportation of minerals.
4) Raised the living standards of people due to income earned.
5) Development of related industries.

GOLD MINING IN SOUTH AFRICA

- Gold is mined using **underground mining** method (**shaft method**).
- Gold is crushed into fine powdery dust.
- Mixed with water until it is fluid mud.
- Cyanide solution is then mixed which causes precipitation of gold.
- Gold is then melted and shaped into bars.

- **GCSE 2014, Q2, Page.**

1. Which of the following method is used for **mining gold** in **South Africa**?

a) Open cast method
b) Shaft method
c) Adit method
d) Dredging method

SIGNIFICANCE OF GOLD MINING TO THE ECONOMY OF SOUTH AFRICA

1. Earns foreign exchange
2. Employment opportunity
3. Has led to widespread urbanization
4. Improvement of infrastructure
5. Has led to development of agriculture

PROBLEMS FACING GOLD MINING

1. Expensive to mine
2. Large capital is required to start mining
3. Complication of mining by folds and faults in the crust.
4. Low gold content in the ore
5. Problem of removal of underground water
6. Collapsing of mines

PETROLEUM IN THE MIDDLE EAST

- Oil producers in the middle east includes:
- **Saudi Arabia, Iraq, Iran, Kuwait, and United Arab Emirates**.
- Middle East countries produce one-third of total petroleum produced in the world.
- Middle East accounts for **64%** of world oil reserves.
- Petroleum is transported by use of pipelines and tankers to the consuming countries.

Formation

- Oil is formed from decomposition of remains of small creatures.
- Over a period of years the remains pilled in layers to form sedimentary rocks.
- These remains were later transformed into oil and gas.

Extraction of oil

- Oil is extracted using **drilling method** and is reached by boring wells.
- The oil or gas is brought to the surface under its own pressure or by pumping.
- Crude oil is processed by refining using a technique called **fractional distillation** in order to extract different products i.e. kerosene, fuel oil, diesel fuel, lubricating oil, gasoline, fertilizers, plastics etc.

- **GCSE 2017, Q19, Page 6.**

1. Which of the following mining type is more suitable for the production of **petroleum?**

a) Open cast mining
b) Underground mining
c) Hydraulic mining
d) Alluvial mining

- **GCSE 2018-RE-EXAM, Q2 (b), Page 7**

b) Name **three** countries that are major producers of petroleum? (**3 marks**)

_____

_____

_____

Contribution of oil to the economies of the Middle East countries

1. Generation of wealth due to revenues generated from oil.
2. Development of infrastructural network.
3. Development of petro – chemical industries
4. Development of social amenities i.e. schools, hospitals etc.
5. Increased political and military power.
6. Oil companies helped in fixing down sand dunes.

PROBLEMS FACING PETROLEUM MINING IN THE MIDDLE EAST

1. Petroleum mining is controlled by multinational companies who remit most of the profits to mother countries.
2. Mining activities have been affected by the frequent wars in the region e.g. the Iraq-Iran war, the Gulf war etc.
3. Reliance on imported labour due to the low population of most of the Middle East oil producing countries.
4. Accidents in the oil field due to subsidence of the mines have led to injuries and death of the miners.
5. Oil spills due to leakages and collision of tankers have caused damage to beaches and marine animals and plants.

SIGNIFICANCE OF MINERAL MINING TO A COUNTRY

1. Creation of employment opportunity
2. Development of settlement
3. Provision of social services
4. Earning foreign exchange
5. Development of transport links
6. Creation of industries
7. Improvement of peoples' standard living

- **GCSE 2018, Q14, Page 5.**

2. The main importance of mining for a country is
a) It gets many tourists
b) People are employed
c) Areas becomes developed
d) It earns or saves hard currency

- **GCSE 2009, Q8 (b), Page 15.**

1. State **four** benefits that a country gets from exploiting its minerals. (**4marks**)

_____

_____

_____

_____