TOPIC 1: WORLD AGRICULTURE

AGRICULTURE

- It is the production of crops and animals on land for food or sale.

FARMING AS A SYSTEM

- Farming is a system because it is made up of interrelated parts which are inputs, processes and outputs.

AGRICULTURE AS AN OPEN SYSTEM

Inputs

- These are things which go into the system for the outputs to be produced.

Processes

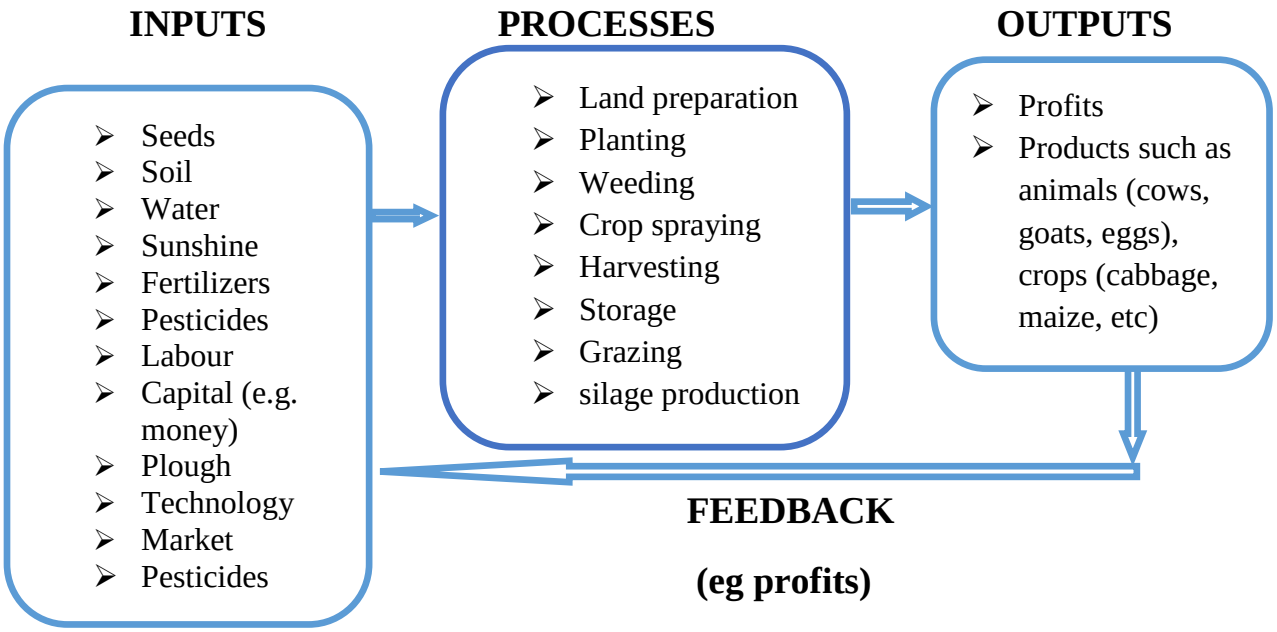
- These refer to procedure through which the inputs go through to produce outputs.

Outputs

- These are the outcomes after the inputs are processed.

CHARACTERISTICS OF AN OPEN SYSTEM

- It uses inputs from the environment.
- It converts (changes) inputs into outputs.
- It discharges outputs into the environment.



- Farming being a system, it means that what happens in one part affects the whole system. For example, the quality of outputs depends on the quality of the inputs and the processes used.

FACTORS THAT INFLUENCE FARMING

- The type of agriculture to be practiced in an area is influenced by many factors. These include the following:

a) Physical factors

b) Human factors
c) Economic factors
d) Technological factors

I.PHYSICAL FACTORS

- These may include the following:
- ✓ ***Climate***
- ✓ ***Topography***
- ✓ ***Soil***
- ✓ ***Biotic factors***

i. CLIMATE

- The climate of an area is determined by both rainfall and temperature. These are useful since rainfall provides moisture for seed germination and plant growth and temperature affects the rate of transpiration which is crucial in the formation of rainfall.
- These may determine the type of crops to be grown and the animals to be kept in an area. For example, annual crops such as maize and groundnuts do not require heavy rains while perennial crops such as tea, cocoa and oil palms require a lot of heavy rainfall.

ii. TOPOGRAPHY

- This refers to the steepness and gentleness of the land.
- On the one hand, the gentleness or flatness of the land promotes the efficiency of farm operations by encouraging irrigation and farm mechanization. These lead to increased farm outputs and profits.
- On the other hand, steep slopes or hilly areas discourage farm mechanization, irrigation and promotes soil erosion which leads to loss of soil fertility. This leads to poor crop yields and losses.
- For example, rice and sugarcane cultivation require flat or low lands while tea and coffee require hilly areas.

iii. SOIL

- Fertile, alluvial and well-drained soils encourage intensive farming. This leads to increased agricultural outputs and profits.
- On the contrary, infertile soils, with poor aeration and poor drainage discourage farming.
- For example, along the Nile and Shire River banks are the fertile, alluvial and well-drained soils that promote farming.

iv. BIOTIC FACTORS

- These may include weeds, parasitic plants, diseases and pests. These damage crops and harm animals. This discourages farming.
- For instance, Africa is heavily infested by locusts that damage crops and tsetse flies that spread ***Trypanosomiasis*** which attacks animals.

II.HUMAN FACTORS

- These include the following
  - ✓ ***Ownership and inheritance of land***
  - ✓ ***Government policies***
  - ✓ ***Religion***
  - ✓ ***Culture***

- ✓ ***Availability of abundant and skilled labour force***
- ✓ ***Political stability***

i.OWNERSHIP AND INHERITANCE OF LAND

- These can determine the type of agriculture to be done in an area.
- For example, rich farmers are able to practice farming on a large scale, and farming is highly commercial and mechanized. This happens because they have access to big plots of land.
- On the other hand, poor farmers have access to small pieces of land. This makes them do small-scale farming, which is mainly subsistence.

ii.GOVERNMENT POLICIES

- Some governments help poor farmers by providing them with grants for new machinery and stock, subsidies for farm inputs (such as fertilizer and seeds), setting minimum prices for agricultural produce and introduction of the quota system in order to control production.
- All these determine the type and amount of production to be done in an area or a country.

iii.RELIGION

- Some religions discourage the development of some types of agriculture.
- For example, the Hindus have great respect for cattle and do not eat beef. This discourages cattle keeping. Similarly, Islam discourages Muslims to be keeping pigs, the Seventh Day Adventist Church discourages the keeping of pigs and growing of tobacco.

iv.CULTURE

- The Fulani and Masai practice pastoralism because of their way of life. This means that they cannot practice settled agriculture.

v.AVAILABILITY OF ABUNDANT AND SKILLED LABOUR FORCE

- A lot of people are always needed to carry out farm operations which include but not limited to; land preparation, planting, weeding, fertilizer application and harvesting.
- Skilled personnel are also needed especially where farms are highly mechanized. Operation of farm machinery needs well-trained people.

vi.AVAILABILITY OF LAND

- Sparsely populated areas create enough land for farming. Where the land is flat, this may promote extensive commercial farming.
- On the contrary, densely populated areas encourage intensive farming since there is not enough land for farming.

III.ECONOMIC FACTORS

- These can take the following forms:
- ✓ ***Capital***
- ✓ ***Markets***
- ✓ ***Financial institutions***
- ✓ ***Transport facilities***

i. CAPITAL

- The amount of capital determines the type of agriculture to be done in an area.
- Capital is a required in farming because it enables the farmer to purchase machinery, inputs (fertilizer, pesticides, etc), rent farm land and payment of labour.

ii. MARKETS

- Farmers should ensure that perishable and bulky crops are produced near markets. These crops may include tomatoes and cabbages.
- This is important since it helps to sale them in good time before they go bad. Producing bulky goods near markets helps to reduce transport costs and maximize profits.

iii. FINANCIAL INSTITUTIONS

- Availability of financial institutions such as banks and famers' cooperatives helps farmers to obtain loans easily to finance their operations on the farm.

iv. TRANSPORT FACILITIES

- Development of efficient transport systems widens the market for agricultural products. For example, railway transport may be needed for the transportation of bulky goods.

IV.TECHNOLOGICAL FACTORS

- This can be in the form of:
- ✓ ***Farm mechanization***
- ✓ ***Use of chemical fertilizers and other agrochemicals***
- ✓ ***Transport***
- ✓ ***Irrigation***
- ✓ ***High-yielding seeds and animal breeds***

i.FARM MECHANIZATION

- Commercial extensive farming such as wheat extensive farming requires heavy use of machines while intensive farming requires abundant labour supply.

ii.USE OF CHEMICAL FETILIZERS

- Most of the land has lost its fertility due to continued erosion and overuse. There is therefore need of chemical fertilizers to supplement to the already available soil fertility.
- However, heavy application of fertilizers is costly and can either increase or decrease the production.

iii.TRANSPORT FACILITIES

- Development of efficient transport systems widens the market for agricultural products. For example, railway transport may be needed for the transportation of bulky goods.

iv.IRRIGATION

- Technology has promoted the development of modern ways of supplying water to crops. This increases production.

v.HIGH-YIELDING SEEDS AND ANIMAL BREEDS

- Now scientists have produced high-yielding seeds and animal breeds. These also mature early. This increases the farmers' returns and in good time.

TYPES OF AGRICULTURAL SYSTEMS BASED ON THE PRODUCE

a) **Arable system:** This is mainly concerned with crop production.
b) **Pastoral system:** This is about animal production, such as cattle, sheep and goats.
c) **Mixed system:** In this system, both crops and animals are produced on the same farm.

CLASSIFICATION OF FARMING SYSTEMS ACCORDING TO PRODUCTION PURPOSE

i. SUBSISTENCE FARMING
ii. COMMERCIAL FAMING

1. SUBSISTENCE FARMING SYSTEM

- It is the type of agriculture that is practiced on a small piece of land where crops are grown and animals are reared mainly for consumption (food).
- Usually farmers keep animals for prestige or as a symbol of status in the society.

CHARACTERISTICS OF SUBSISTENCE FARMING

- Use of simple techniques of cultivation.
- Farmers own small plots of land.
- Production is mainly for food (consumption).
- Employment of family labour.
- If there is surplus, it is sold locally.
- Low standards of living.
- It is practiced by farmers who live in economically backward areas.

TYPES OF SUBSISTENCE FARMING

a) Subsistence crop farming
b) Subsistence animal farming

SUBSISTENCE CROP FARMING

- This is a primitive way of farming done by primitive people in many parts of underdeveloped regions of Africa, South America and South East Asia.
- Subsistence farming is known by different names in different parts of the world. See the table below.

NAME OF SUBSISTENCE FARMING	COUNTRY
Milpa	Zimbabwe
Ladang	Malaysia
Tamrai	Thailand
Taungya	Burma
Roca	Brazil

NAME OF SUBSISTENCE FARMING	COUNTRY
Chitemene	Zambia
Visoso	Malawi
Masole	Zaire (DRC)
Chena	Sri Lanka
Cairying	Philippines
Poda or Bewar	India

SHIFTING CULTIVATION

- Shifting cultivation is known as **slash and burn** *because it involves clearance and burning of selected plots where alternative cropping is done for a few years.*

HOW SHIFTING CULRTIVATION IS DONE

- Usually, farmers clear parts of the forest by cutting down trees and grass, and then leave them to dry. These are later burned to produce ashes that improve soil fertility. Each plot is used for some few years until soil fertility is exhausted, then it is abandoned and the farmer clears another plot of forest.

CHARACTERISTICS OF SHIFTING CULTIVATION

i. Farmers use simple tools such as hoes, axes, panga knives, etc.

ii. Clearance of forests is done by fire so that the ashes add fertility to the soil.
iii. Crops such as rice, millet, maize, sweet potatoes, etc. are grown.
iv. It is done in sparsely populated areas where vegetation is allowed to grow.
v. Farmers barely use manure or fertilizer because the ashes add fertility to the soil.
vi. Plots are usually small.
vii. Few crops are grown.
viii. When the yields decline, the plots are abandoned for new plots.

MIGRATION SYSTEMS IN SHIFTING CULTIVATION

- The continuous movement of cropping results in a slow migration of the population. This migration takes the following forms.

1. Random shifts

❖ This is where no defined routes are followed in their movements.

2. Linear shifts

❖ This is where the newly cleared plots are adjacent to the previous plots.

3. Cyclic shifts

❖ This migration follows a circular pattern.

ADVANTAGES OF SHIFTING CULTIVATION

- It is easy to control weeds since some weeds are burnt during burning.
- Burning of ashes saves time and labour costs.
- Burning produces ash rich in potash that improves soil fertility.

DISADVANTAGES OF SHIFTING CULTIVATION

i. Difficult to introduce innovations.
ii. It leads to loss of soil fertility due to soil erosion.
iii. Destruction of forests leads to climate change that promotes flooding and droughts.
iv. Creation of food insecurity at household level as yields decline.

INTENSIVE FARMING SYSTEM

➢ This involves the application of a lot of labour and capital to relatively small-sized farms, and yields per unit area are very high.

LOCATION

➢ Intensive farming is best developed in monsoon lands of Asia which have dense populations.
➢ The monsoon region covers areas such as china, Japan, India, etc.
❖ Small plots of land are used with greater intensity to support the fast growing population.

CHARACTERISTICS OF INTENSIVE FARMING SYSTEM

i. Land holdings are very small.
ii. Yields per unit area are high but low per man.
iii. Use of irrigation to supplement the usual rainfall.
iv. Growing crops twice or thrice a year to support the growing population.
v. Use of manure and heavy application of fertilizer to obtain high yields.
vi. Animal farming is little developed.

ADVANTAGES OF INTENSIVE FARMING

✓ Farmers can harvest twice or thrice a year. This helps to reduce food insecurity.

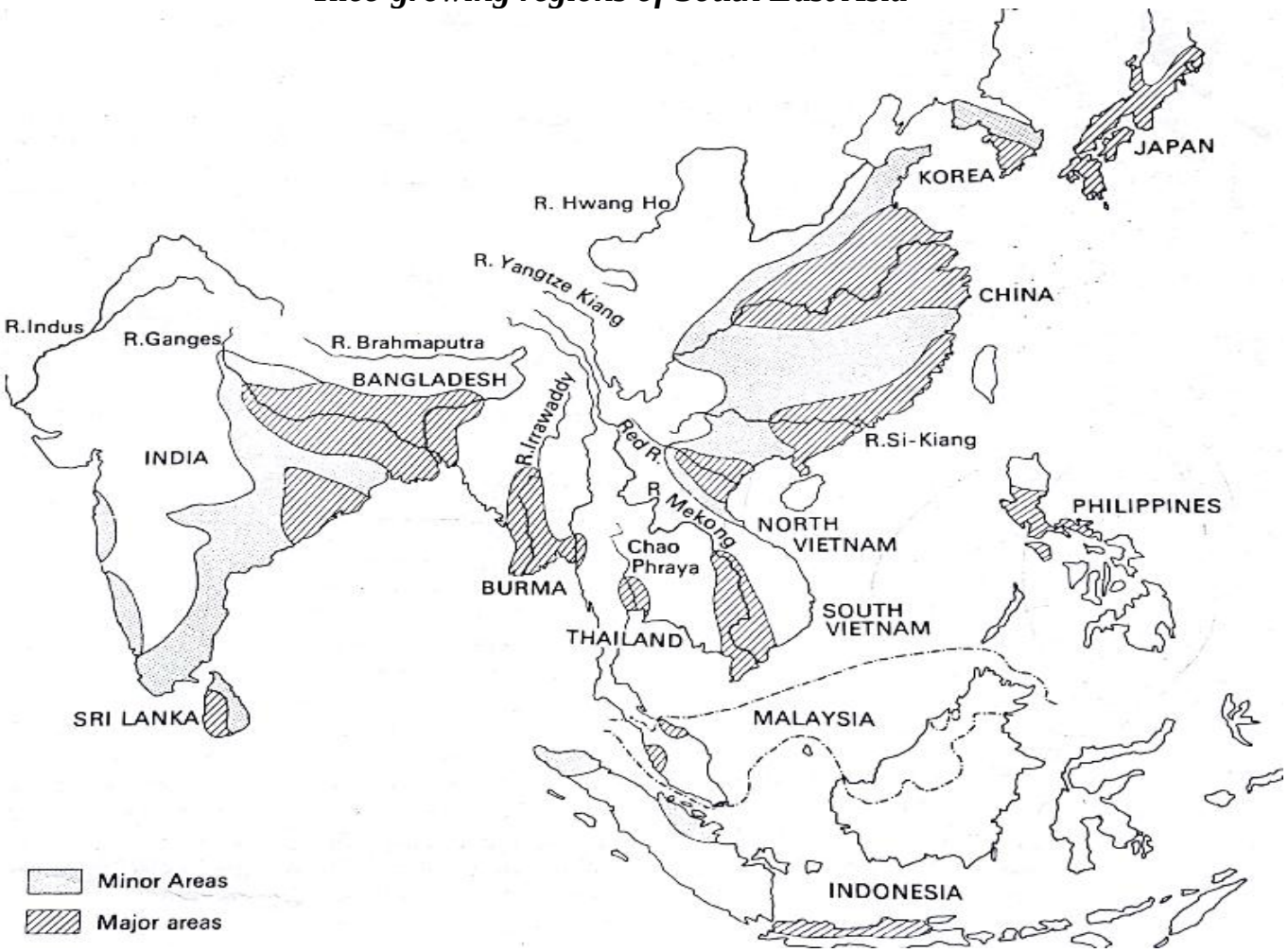
- ✓ High crop yields per hectare.
- ✓ It is easy to do irrigation faming as opposed to commercial extensive.
- ✓ It promotes preservation of woodlands and wildlife since farming is done in specified areas.

DISADVANTAGES OF INTENSIVE FARMING

- ✓ It is negatively affected where labour is insufficient since machines cannot be used.
- ✓ A lot of capital is required.
- ✓ It cannot be used for commercial purposes since the plots are usually small.
- ✓ There is under-utilization of animals.
- ✓ Land holdings are fragmented and scattered which makes it difficult to manage.
- ✓ Labour input is very high.
- ✓ It causes rheumatism which poses a serious occupational hazard.

CASE STUDY 1: INTENSIVE RICE FARMING IN SOUTH EAST ASIA

Rice-growing regions of South East Asia



TYPES OF RICE CULTIVATION

a) Lowland or wet rice

☞ This is grown on flat coastal and river or delta plains that are flooded by irrigation.

b) Upland or dry rice

☞ This is grown in hilly areas where flood irrigation is impossible. It only depends on rains for moisture. Terraces are made on hill slopes to retain water flowing down the slopes.

CONDITIONS FOR RICE GROWING

a) Water Supply

- Annual rainfall of over 2000mm with at least 120mm per month in the growing season.
- Flooded conditions are essential during the transplanting of the seedlings.
- Dry, sunny period is needed soon before harvesting.

b) Temperature

- At least 15.5 degrees to germinate and well over 21 degrees to grow. Average of 18^{o}C-19^{o}C.
- This is followed by a dry period in which the crop ripens.

c) Soil

- The soil should be able to retain moisture.
- Heavy clay or loamy soils are ideal for rice farming.

d) Level (flat) ground

- Level ground enables fields to be flooded or irrigated.
- When the area has slopes, terraces are constructed.

e) Labour

- The use of machinery is non-existent, so human labour is required from land preparation to harvesting.

RICE CULTIVATION PRACTICES

a) Preparation of fields

- Before the beginning of the rainy season farmers construct bunds or ridges to separate fields, weeds are removed, the ground is ploughed by buffaloes.

b) Nurseries, sowing and transplanting

- Seedlings are raised in nurseries and then transplanted to the prepared fields.

c) Field maintenance

- Weeding and thinning are done two weeks after transplanting, and continues throughout the growing season.
- Water is supplied to ensure proper growth. The fields are drained just before rice is harvested to allow it to ripen.

d) Fertiliser application

- This is done soon before transplanting, one month after transplanting and one month before flowering.

e) Harvesting and processing

- Rice reaches maturity after six months. The fields are then drained to allow it ripen.
- Rice is harvested using sickle or a sharp knife. Then it is threshed, winnowed and stored.

Annual activities on the rice field in India

SEASON	MONTH	FIELD ACTIVITIES
Rainy Season (Khalif)	• June	❖ The beginning of monsoon rains. Rice sown in nursery beds
	• July	❖ Fields ploughed and manured
	• August	❖ Transplanting seedlings from nursery beds to main fields

	• September & October	❖ Weeding and applying manure
Dry Season (Rabi)	• November	❖ Monsoon rains end, rice on higher grounds ready for harvest
	• December	❖ Main harvesting period
	• January	❖ Field ploughing, sowing of beans, peas
	• February	❖ Second rice crop is weeded
	• March	❖ Harvesting second crop
	• April	❖ No work on the fields
	• May	❖ No work on the fields, rainy season approaches

REASONS WHY RICE CULTIVATION IN SOUTH EAST ASIA IS STILL AT SUBSISTENCE LEVEL

1) Droughts are common
2) Loss of soil fertility due to soil erosion, salinity and leaching.
3) Flooding resulting from rising sea levels.
4) Rapid population growth makes production not enough to meet the rice demand.
5) Land fragmentation due to high populations, making farm mechanization almost impossible.
6) Poverty which makes farmers fail access farm inputs.
7) Poor marketing resulting from inadequate trading arrangements, poor transportation and storage. These discourage many farmers.

PROBLEMS (CHALLENGES) ASSOCIATEED WITH RICE FARMING IN SOUTH EAST ASIA

- Loss of soil fertility resulting from soil erosion and continuous cultivation of rice.
- Rheumatism since farmers spend most of their time in the fields.
- Rice releases a lot of methane into the atmosphere, this promotes global warming.
- Waterborne diseases are common since farmers work in flooded conditions most of the time.

IMPORTANCE OF RICE CULTIVATION IN SOUTH EAST ASIA

- ✓ It promotes food security.
- ✓ Creation of employment.
- ✓ Provision of income to farmers.
- ✓ Provision of raw materials.
- ✓ Provision of government revenue through taxation.
- ✓ Rice has a cultural value in South East Asia.

AREAS WHERE RICE IS GROWN IN MALAWI

- Karonga district
- Nkhatabay district
- Salima district
- Nkhotakota district
- Zomba district
- Phalombe district
- Machinga district

FACTORS THAT LIMIT RICE CULTIVATION IN MALAWI

- ☞ Lack of adequate knowledge on rice production.
- ☞ Loss of soil fertility due to leaching and soil erosion.

- ☞ Droughts are common.
- ☞ Lack of farm machinery.
- ☞ Lack of hybrid rice varieties.
- ☞ Poor rice prices on the market.
- ☞ Presence of pests and diseases.

WAYS OF IMPROVING RICE CULTIVATION IN MALAWI

- ➢ Establishment and expansion of irrigation schemes through the green belt initiative.
- ➢ Increasing research in rice production.
- ➢ Searching for international markets for the exportation of rice.
- ➢ Provision of loans to poor rice farmers.
- ➢ Improving farm input subsidy programmes for the farmers.
- ➢ Investing in simple machinery such as treadle pumps for irrigation.

DAIRY FARMING IN DENMARK

➢ Dairy farming is the rearing of animals mainly for milk and milk products.

MAIN AREAS WHERE DAIRY FARMING IS DONE

1. Netherlands (esp. **Holland**)
2. Demark
3. Switzerland
4. New Zealand
5. South-East Australia
6. France
7. South Africa

FAVOURABLE CONDITIONS FOR DAIRY FARMING IN DENMARK

a) Presence of transport and transport routes.

➢ For easy access to the market since milk is highly perishable.

b) Availability of green and quality pastures

➢ This is food for animals.
➢ It can be silage and alfalfa.

c) Easy access to markets

➢ Many areas are urban centres. This helps for fast selling since milk is perishable.

d) Mild climate

➢ Mild and wet conditions, with cool summers and mild winters are ideal for the growth of pastures.
➢ Cool climate also prevents multiplication of parasites for livestock.

e) Fertile soils

➢ This promotes the growth of pastures.

f) Development of science and technology

➢ Many farms in Denmark are highly mechanized, scientifically improved breeds. The country also has advanced storage facilities which prevent milk from going bad.

g) Skilled labour

➢ This promotes efficiency in farm operations.

h) Availability of capital

➢ The country has rich people that can afford such expensive investments.

BREEDS OF DAIRY CATTLE (INCLUDING IN DENMARK)

a) Milking short horn
b) Guernsey
c) Friesian
d) Brown Swiss
e) Jersey
f) Alderney
g) Holstein

CHARACTERISTICS OF DAIRY FARMING

- The farms are small.
- Intensive capital outlay.
- Intensive farming methods are used.
- The main source of income is milk.

FACTORS THAT HELP TO INCREASE MILK PRODUCTION FROM DAIRY CATTLE

- ✓ Enough feed which are a combination of hay clover (alfalfa), silage and a mixture of grains and seed by-products.
- ✓ Enough space for each animal in the kraal.
- ✓ Very high sanitary conditions.
- ✓ A lot of clean water.

CROPS GROWN FOR DAIRY FARMING

- ➢ Oats
- ➢ Barley
- ➢ Wheat
- ➢ Potatoes
- ➢ Sugar beets
- ➢ Grass

ANNUAL CYCLE OF ACTIVITIES ON A DAIRY FARM

MONTH	FARM ACTIVITIES
November-January	▪ Poor weather, animals stall-fed.
March-April	▪ Ploughing and sowing seeds.
May-July	▪ Weeding the fields.
August	▪ Harvesting cereals
September	▪ Harvesting root crops.
October	▪ Ploughing and sowing seeds.

MAIN PRODUCTS OF DAIRY FARMING

i. Cheese
ii. Butter
iii. Yoghurt
iv. Shangko
v. Settle
vi. Cue-mate
vii. Bioniche animal health
viii. Minitude
ix. Ice creamn
x. Condensed milk
xi. Powdered milk

MANAGEMENT OF DAIRY FARMS

- The management of dairy farms is mainly done by co-operatives

CO-OPERATIVES

- ➢ A cooperative is made up of several dairy farms which are operated and managed by individual farmers.
- ➢ The members finance the co-operative by putting their resources together and share profits.
- ➢ It earns in proportion to the volume of the milk they market through the co-operative.

IMPORTANCE OF CO-OPERATIVES

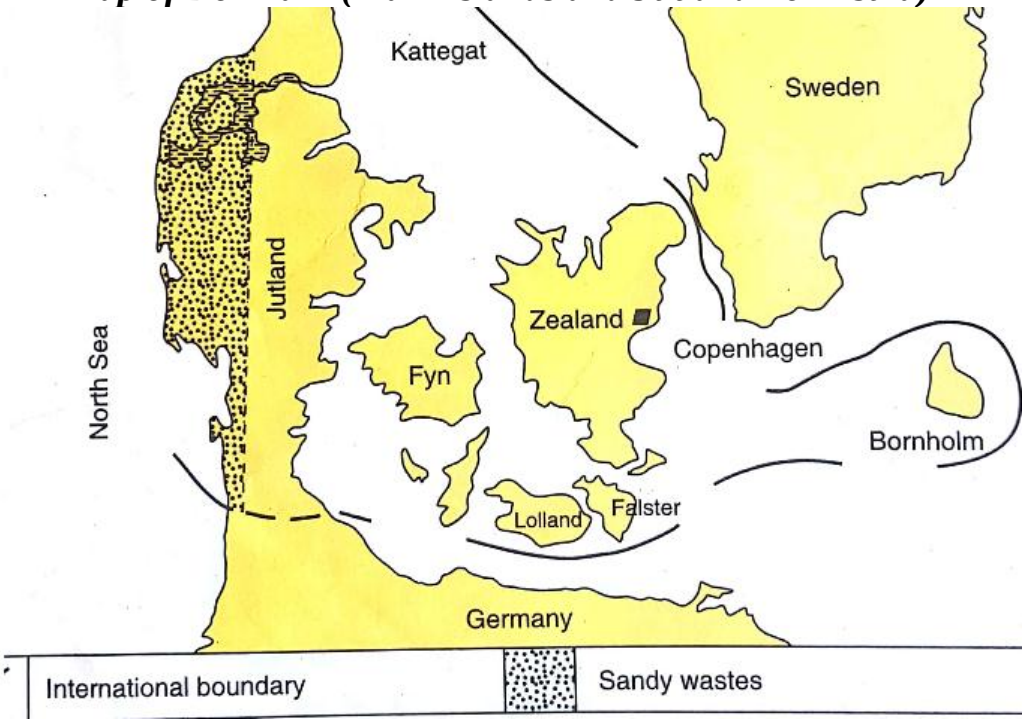
- ❖ They provide loans to farmers.
- ❖ They provide advice and research findings to the dairy farmers on how to improve the efficiency of dairy farms.
- ❖ They buy farm inputs for farmers in bulk. This enables them to buy at low prices and maximize profits.
- ❖ They have processing facilities which enable farmers get profits they could not get on their own.
- ❖ They provide marketing services by collecting, grading, and storing farm produce and sell them later.

REASON WHY DENMARK IS CALLED A LAND OF CO-OPERATIVES

- ▪ It is because there are thousands of co-operative societies in Denmark.

Location of Major Dairy Farming areas of the World

Map of Denmark (Main Islands and Jutland Peninsula)



MAIN ISLANDS IN DENMARK

i. Zealand
ii. Fyn
iii. Falster
iv. Lolland

THE MAINLAND IN DENMARK

✓ Jutland peninsula

NOTE:

- On the one hand, the soils of western Jutland are sandy and infertile. To be useful, the soil is treated and reclaimed.
- On the other hand, the soils of eastern Jutland and other islands mentioned above are very fertile and densely populated.

- One of the farms on Denmark is The Asserhoigaard farm on Zealand Island.
- It is a small farm.
- The relief of Asserhoigaard farm is flat. This enables the use of machinery.
- The fertile soil enables the growth of grains and grass successfully.

THE FOLK HIGH SCHOOLS AND THE DAIRY INDUSTRY

FOLK HIGH SCHOOLS

- These are private schools which provide adult education.

Main Subjects offered

- Agriculture for men (from November to April).
- Home economics for women (from May to August).

- ***Men are taught latest agricultural techniques. This gives them a good background to the co-operative societies and the dairy industry as a whole.***

IMPORTANCE OF THE DAIRY INDUSTRY TO DENMARK

a) Provision of employment to many people.
b) Provision of foreign exchange. Denmark exports 24% of the world's butter supply and 3% of the cheese mostly to ***Germany*** and the ***United Kingdom (UK)***.
c) Provision of government revenue through taxation.
d) Source of valuable food nutrients *(mostly proteins).*

PROBLEMS FACED BY DAIRY FARMERS IN DENMARK

1) **Long cold winters:** This promotes stall feeding which is costly.
2) **Scarcity of labour:** Many young people prefer white-color jobs to working in daily farms
3) **Insufficient farming land:** This is a serious problem due to rapid population growth.

DAIRY FARMING IN MALAWI

AREAS WHERE DAIRY FARMING IS DONE IN MALAWI

1. Katete farm
2. Bvumbwe
3. Mzuzu Dairy Plant
4. Blantyre Dairy plant
5. Lilongwe Dairy Plant

6. Ndata farm

IMPORTANCE OF DAIRY FARMING IN MALAWI

- ✓ Source of valuable food nutrients such as proteins, vitamins and fats.
- ✓ Source of income to dairy farmers.
- ✓ Provision of manure that improves soil fertility.
- ✓ Reduction of importation of dairy products. This saves foreign reserves.
- ✓ Source of government revenue through taxation.
- ✓ Provision of employment in the dairy industry.

PROBLEMS FACED BY DAIRY FARMERS IN MALAWI

i. Lack of capital for buying dairy breeds.
ii. It is difficult to obtain loans for starting up and managing the dairy farms.
iii. Native breeds produce insufficient milk.
iv. Lack of scientific techniques due to shortage of trained personnel in the dairy industry.
v. Feed is expensive.
vi. Prevalence of tropical parasites, diseases and harsh climate limit dairy farming.
vii. High government surtax on dairy farms. This reduces profits for dairy farmers.
viii. Lack of proper storage facilities. Milk is highly perishable.
ix. Poor road networks for farmers to take the milk and dairy products to urban markets.

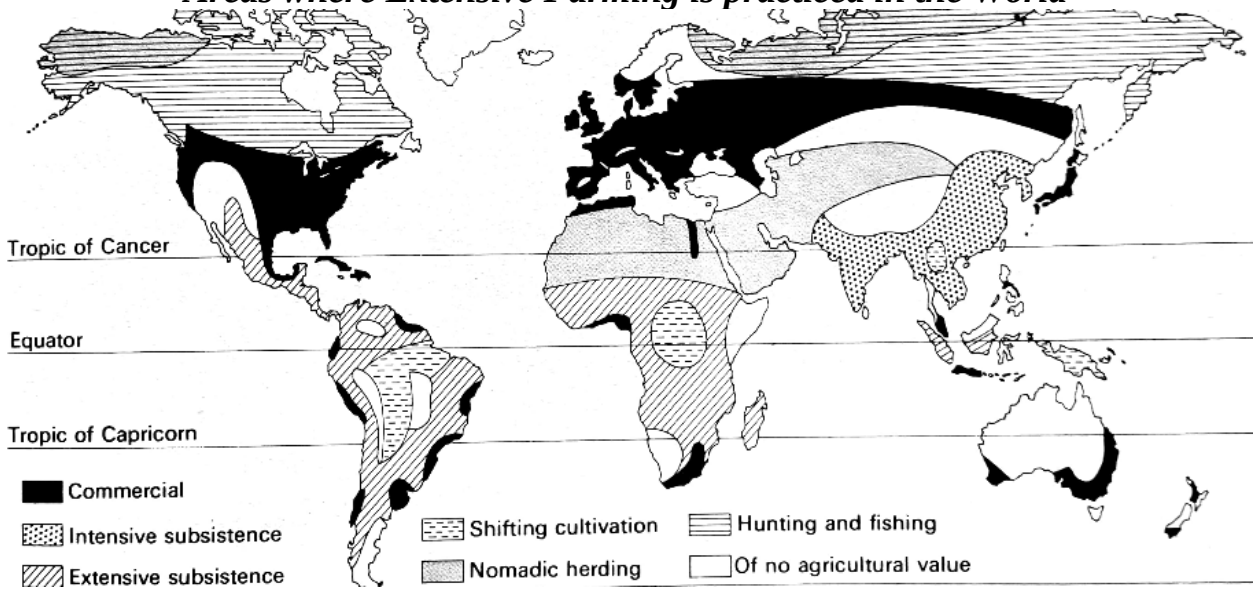
WAYS OF IMPROVING DAIRY FARMING IN MALAWI

- ☞ Provision of veterinary services such as artificial insemination to improve the dairy breeds.
- ☞ Training farmers on dairy farming. For example, on feed-making.
- ☞ Provision of cooling centres close to dairy farmers to prevent milk from going bad.
- ☞ Provision of loans in-kind to dairy farmers. For example, giving a farmer a cow, and that when the offspring is born, it should be given to another farmer.

COMMERCIAL EXTENSIVE FARMING

- This s the type of farming which is done on very large land holdings.
- It is practiced in areas that are sparsely populated.

Areas where Extensive Farming is practiced in the World



RELATIONSHIP BETWEEN POPULATION DENSITY AND EXTENSIVE FARMING

- It is practiced in areas that have low population density. This provides enough land for farming.

AREAS WHERE EXTENSIVE FARMING IS DONE

i. Canadian Prairies (wheat is grown)
ii. Pampas of Argentina
iii. Downs of Australia
iv. New Zealand
v. Steppes of the Commonwealth of Independent States (**C.I.S**)
vi. Denmark
vii. Netherlands
viii. High Veldt of Natal and Botswana (ranching)

CHARACTERISTICS OF EXTENSIVE FARMING

- Farms are very large.
- Cultivation is highly mechanized.
- Monocultural cropping is common (cultivation of only one type of crop).
- Low yields per hectare but high yields per man.
- Generally the farms are farmer-owned.
- It employs small labour force.

ACTIVITIES ASSOCIATED WITH EXTENSIVE FARMING

CROPS GROWN IN EXTENSIVE FARMING

- ✓ Wheat

ANIMALS KEPT

- ✓ Cattle
- ✓ Sheep
- ✓ Horses

} ***On Ranches***

PROBLEMS ASSOCIATED WITH EXTENSIVE FARMING

- Since only one type of crop is grown (monoculture), any price fluctuation on the international markets can have devastating effects.
- Droughts have devastating effects on the crop cultivated since irrigation is not practiced.
- The growing of the same crop every year promotes the multiplication of pests and diseases, it also leads to loss of soil fertility.
- It requires sparsely populated areas and flat land for mechanization. These may be difficult to find due rapid population growth that puts pressure on land resources for settlement and farming.

EXTENSIVE WHEAT FARMING

FAVOURABLE CONDITIONS FOR THE GROWTH OF WHEAT

a) Rainfall of between 305mm and 1015mm. (western prairies receives little rains, so irrigation is done)
b) Gentle undulating land to enable the use of machinery.
c) Well-drained heavy loamy or light clay soils. Such as the chernozem of the steppes.

d) Temperature of between 15ºC and 21ºC. Warm-dry sunny period is required to enable wheat to ripen.
e) Frost free period of 100 days.

USES OF WHEAT

1) ***Semolina*** *for making:*
   - ✓ Spaghetti
   - ✓ Macaroni
   - ✓ Vermicelli
2) For making bread
3) For making cakes
4) For making breakfast cereals
5) For making biscuits
6) For making pie crust
7) For making ice cream cones

MAIN WORLD PRODUCERS OF WHEAT

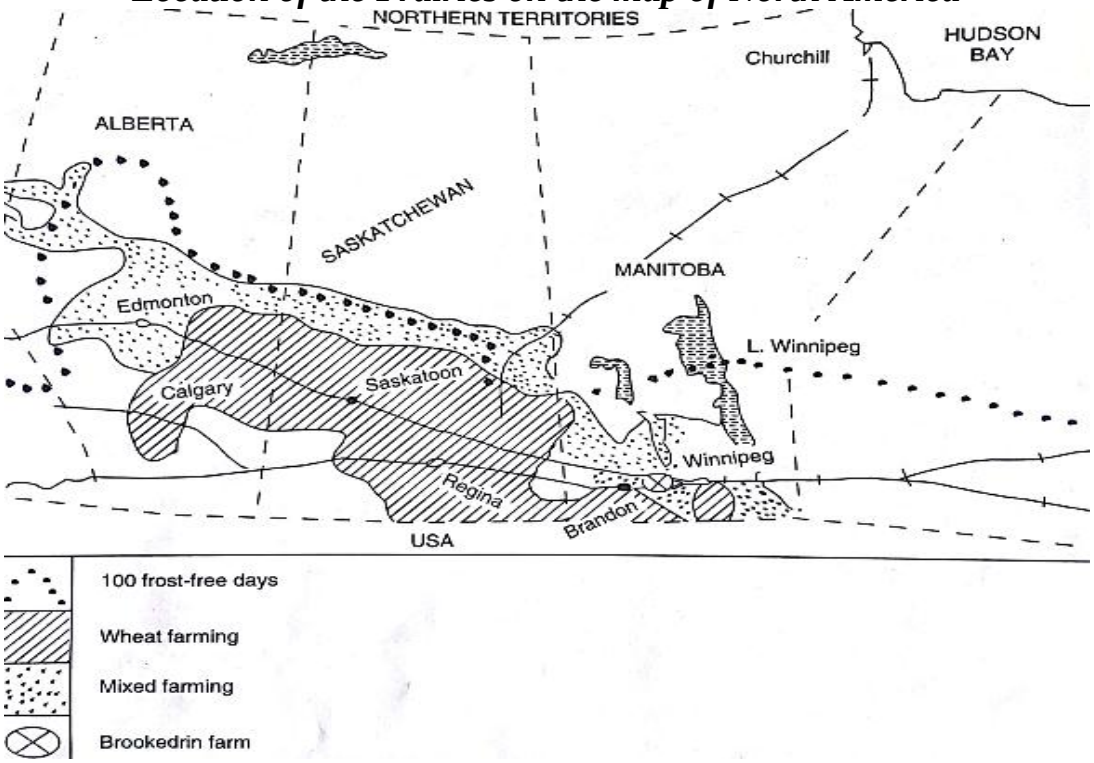
a) Commonwealth of Independent States (**C.I.S**)
b) USA
c) China
d) Canada
e) France

CASE STUDY 1 OF EXTENSIVE FARMING:

EXTENSIVE WHEAT FARMING ON THE PRAIRIES IN CANADA

- The prairies are gently undulating, almost flat, with tall grass but without trees.
- It covers the southern regions of Manitoba, Alberta and Saskatchewan in Canada and Central America.
- The Rocky Mountains prevent maritime air masses from moving easily into the prairie region and the chinook winds.
- The summers are warm.
- The continental air masses make the prairies dry with considerably less rainfall.

Location of the Prairies on the map of North America



CLIMATE OF SASKATOON IN SASKATCHEWAN

Months	J	F	M	A	M	J	J	A	S	O	N	D
Temp (ºC)	-18	-15	0	3	10	14	19	15	11	3	-7	-12
Rainfall (mm)	18	18	20	21	38	60	60	44	36	20	18	17

CONTRASTING LAND USE ON THE PRAIRIES

- Land preparation is done, ploughing follows then the land is treated with fertilizers in October.
- There is snow in winter (Nov-March), this impedes cultivation. This is the time machinery and buildings are repaired and maintained.
- Wheat is sown and potatoes grown in spring (April-May) when temperatures start to rise, making snow to melt that provides moisture for germination and growth of seedlings.
- Spraying of chemicals takes place in June and July to prevent pests and diseases.
- Harvesting of wheat takes place in August and potatoes are harvested in September.
- 90% of wheat is sold locally, over 5% is exported to Europe, Japan, Indonesia, Korea, etc.

REASONS FOR CULTIVATING WHEAT ON THE CANADIAN PRAIRIES

✓ Extensive cheap land was originally available.
✓ Extension of railway lines into the prairies makes transportation of wheat and inputs easy.
✓ Well-drained flat topography promotes farm mechanization.
✓ Fertile, dark-brown soils of prairies promote the growth of wheat.
✓ Access to internal, continental and world markets.
✓ Suitable climate.
❖ One of the wheat farms in Canada is Brookedrin.

BROOKEDRIN FARM IN CANADA

- It is located to the west of Winnipeg town in Manitoba.
- Most of the wheat is sown in spring when winter snow melts to provide moisture for germination and growth.

ANNUAL ACTIVITIES ON THE BROOKEDRIN FARM

MONTH	FARMING ACTIVITIES
April to May	✓ Sowing wheat and growing potatoes.
June to July	✓ Weeding and chemical spraying.
August	✓ Harvesting wheat and transporting it to elevators or storage depots at the nearest railway station.
September	✓ Potatoes are harvested
October	✓ Ploughing the fields and treating them with fertilizer.
November to December	✓ Repair and general maintenance of farm structures and equipment. Sowing impedes work on the land.

IMPORTANCE OF WHEAT FARMING

a. Provision of foreign exchange through wheat export.
b. Source of income to local farmers through local sales.
c. It is a raw material in the bakery industry.

d. Creation of employment to the local people.
e. Provision of revenue to the government through taxation.

PROBLEMS FACED ON THE PRAIRIES WHEAT FARMS

- ☞ Fluctuation of prices on the world market due to unregulated (uncontrolled) wheat production.
- ☞ Droughts, hail, storms and frost have negative effects on wheat growing.
- ☞ Gophers, mice and grasshoppers damage the crop if not harvested in good time.

EXPORTATION OF WHEAT

- ➢ Half (50%) of the exported wheat is handled by the route through Winnipeg, the largest of the prairies cities, wheat market and the industrial city.
- ➢ It is then exported to Europe using this route through ***Port Arthur*** and ***Fort William*** on Lake Superior and the Great Lakes.
- ➢ About 10% of the wheat is transported and exported to Europe through the ports of St. John and Halifax.
- ➢ Nearly 30% of the wheat moves westwards to Pacific Ports of ***Vancouver*** and ***Seattle*** to the Far East (Japan, Indonesia and Korea).

CASE STUDY 2 OF EXTENSIVE FARMING:

RANCHING IN ARGENTINA

DEFINITION OF TERMS

a) Ranches

- ➢ These are large pieces of land where animals are kept.

b) Ranching

- ➢ These are all activities that take place on a ranch involving the raising of livestock.

c) Estancias

- ➢ These are extensive farms in south America that extend up to 100 square kilometres on which cattle are kept on a large scale for commercial purposes.
- ➢ They are organized by the gauchos (cowboys).

d) Chacras

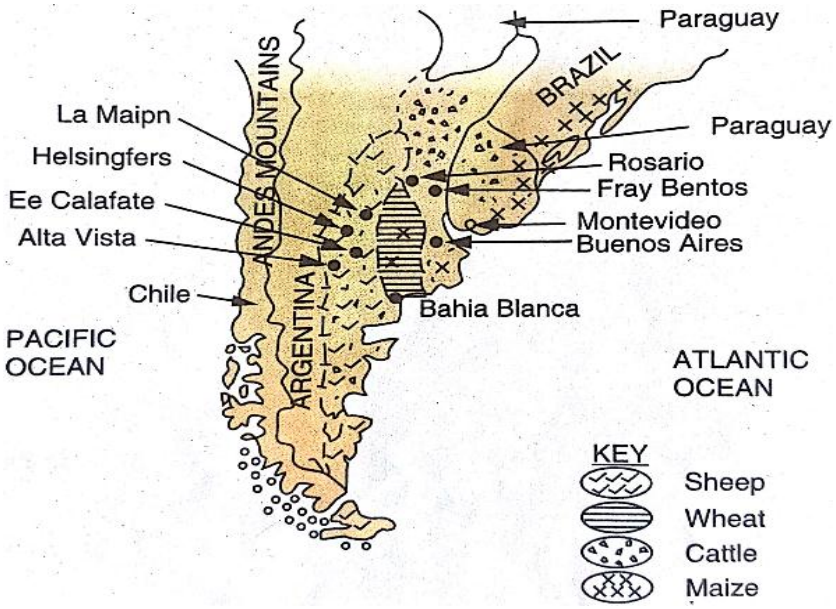
- ➢ These are small cattle estates as compared to estancias.

e) Saladeros

- ➢ These are butcheries that process corned and salted beef.

f) Frigorificos: It is a cattle-slaughtering and meat freezing establishment.

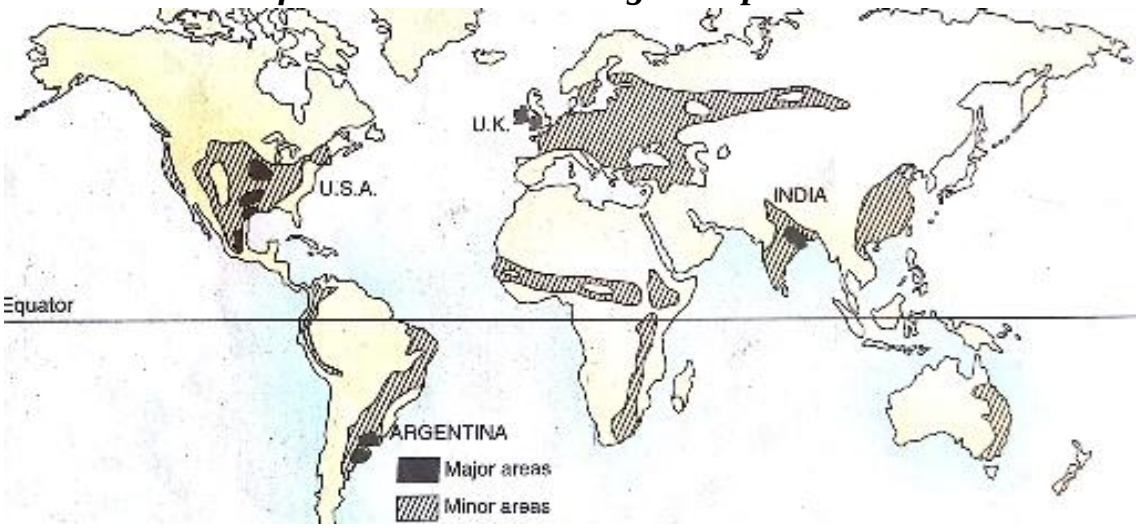
Location of Argentina on Map of South America



AREAS WHERE RANCHING IS DONE IN THE WORLD

i. Argentina (they are called **pampas**)
ii. Natal and Botswana (they are called **high veld**)
iii. Australia and New Zealand (they are called **downs**)
iv. Commonwealth of Independent States (C.I.S), Denmark and Netherlands (**steppes**)
v. North America (**prairies**)

Location of areas where Ranching takes place in the World



CONDITIONS FAVOURING RANCHING IN ARGENTINA

1) Topography

- Presence of flat land for easy movement of animals.

2) Favourable Grass

- Availability of plenty of pastures. Alfalfa grass and folder crops are ideal for animal feeding.

3) Good Climate

- Temperatures are above freezing point and maritime (water-related) climate makes grazing to take place all year round.
- The area receives rainfall of about 900mm. this enables the grass to grow properly.

4) Access to Markets

- Availability of local and international markets maintains the industry.

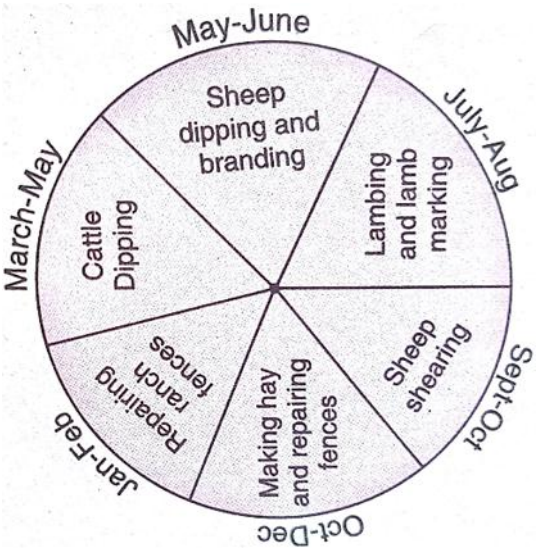
5) Good Transport Networks

- The availability of railways makes it easy to transport animals to fattening camps, and later to frigorificos.

6) Sparse Population

- There is low population density in the pampas plains which creates enough land for grazing.

Activities on the Ranch



REASONS FOR DOING THE FOLLOWING ACTIVITIES ON A RANCH

a) Sheep Shearing

✓ This is done to easily identify the sheep.

b) Lamb Making

✓ This is done to easily identify the lambs.

c) Branding

✓ For stating the age of the sheep with reference to the growth of fleece at the back.

LIVESTOCK RAISED ON RANCHES

❖ Cattle
❖ Sheep
❖ Horses
❖ Reindeers (in Siberia)

CATTLE BREEDS ON THE RANCH

✓ Hereford
✓ Shorthorn
✓ Aberdeen
✓ Angus
✓ Brahman

ANIMAL PRODUCTS FROM THE ESTANCIA

- Maize
- Leather
- Cooking oil
- Fertilizer
- Glue (from horns and hooves)
- Fats

CROPS GROWN ON ESTANCIA

1. Maize
2. Oats
3. Alfalfa
4. Wheat
5. Vegetables

IMPORTANCE OF RANCHING TO THE ECONOMY OF ARGENTINA

i. Source of employment to many people.

ii. Source of foreign exchange earnings.
iii. Source of raw materials for industries.
iv. Source of income to local farms after the sales of their livestock or livestock products.
v. Source of government revenue through taxation.

PROBLEMS ASSOCIATED WITH RANCHING IN ARGENTINA

- High incidences of pests such as cattle ticks.
- Occurrence of cattle diseases such as East Coast Fever and Foot and Mouth disease.
- Local winds such as Zonda and Pampero kill animals in summer (Nov-Feb).
- Rainfall is not reliable in summer since high temperatures disturb condensation. Winters are dry. This leads to insufficient pastures.
- Price fluctuation on the world markets.
- High fixed costs and very high investment.
- Droughts increase the risk of production.

COUNTRIES THAT IMPORT MEAT FROM ARGENTINA

i. Arab States
ii. United States
iii. Germany
iv. Canada
v. Israel
vi. France
vii. United States of America
viii. Spain

DIFFERENCES BETWEEN RANCHING AND PASTORAL NOMADISM

LIVESTOCK RANCHING	PASTORAL NOMADISM
➢ Vegetative cover is continuous	➢ Vegetative cover is seasonal
➢ Little or no migration	➢ Continuous migration
➢ Scientifically managed	➢ No scientific management
➢ Animals raised for sale	➢ Animals are for subsistence of prestige
➢ Low stocking ration	➢ Very high stocking ratio
➢ Development oriented	➢ No development is possible

CHARACTERISTICS OF RANCHING

- Usually, only one type of animal is kept in large numbers. Farmers aim at a single product such as wool.
- It is practiced in marginal zones where diversification is not commercially worthwhile.
- It is done on a large scale and depends on natural vegetation for pasturage and browse.

CLASSIFICATION

- Whether the pastures are fenced, or the extent which the fencing divides the ranch.
- Whether and how the pastures are managed.

- How far the watering points are from one another, or how much capital is invested in the troughs, pumps and pipes.

TYPES OF RANCHING SYSTEMS

1) Open Grazing System

- This is where the herds are continually watched by herdsmen.

2) Fields or Paddock System

- This is where the work of guarding the animals is replaced by investment in fencing and water places.

INSIDE A FRIGORIFICOS

- When the animals arrive, they are weighed, cleaned and led into slaughtering rooms.
- In these rooms, they are shocked and killed, and the head and hides are removed.
- Once the offals are removed, the carcasses are frozen, ready for exports.
- The hides are dried after fats are extracted and then exported.

OUT OF A FRIGORIFICOS

- Some meet is sold to canning factories.
- Most of the meat is exported in chilled or frozen form.

COMPARISON OF BEEF INDUSTRY IN MALAWI WITH CATTLE RANCHING IN ARGENTINA

IN ARGENTINA	IN MALAWI
❖ Hybrids produce high quality meat in high quantities.	❖ Local breeds produce insufficient meat and milk.
❖ Animals are raised on large estates (ranches).	❖ Animals are raised on customary land, looked after by herders when grazing.
❖ Animals are scientifically managed.	❖ No scientific management involved.
❖ Good quality pastures (alfalfa and folder crops).	❖ Poor quality pastures.
❖ Animals are kept mainly for commercial purposes	❖ Animals kept both for commercial and subsistence purposes. ❖ Animals are also kept as a symbol of wealth.

PROBLEMS FACING RANCHING IN MALAWI

- Pastures are not readily available throughout the year.
- Native breeds of cattle (the Zebu) produce low quality and quantity of meat.
- Pests and diseases such as tsetse flies and foot and mouth diseases.
- Lack of management skills.
- Lack of capital for buying equipment and hybrid animals.

IRRIGATION

- It is an artificial application of water to the soil to assist in the growing of crops during periods of inadequate rainfall.

OR

- It is the supplying of water onto the land to enable crops to grow.

☞ It reduces the length of period in which lack of moisture retards plant growth.

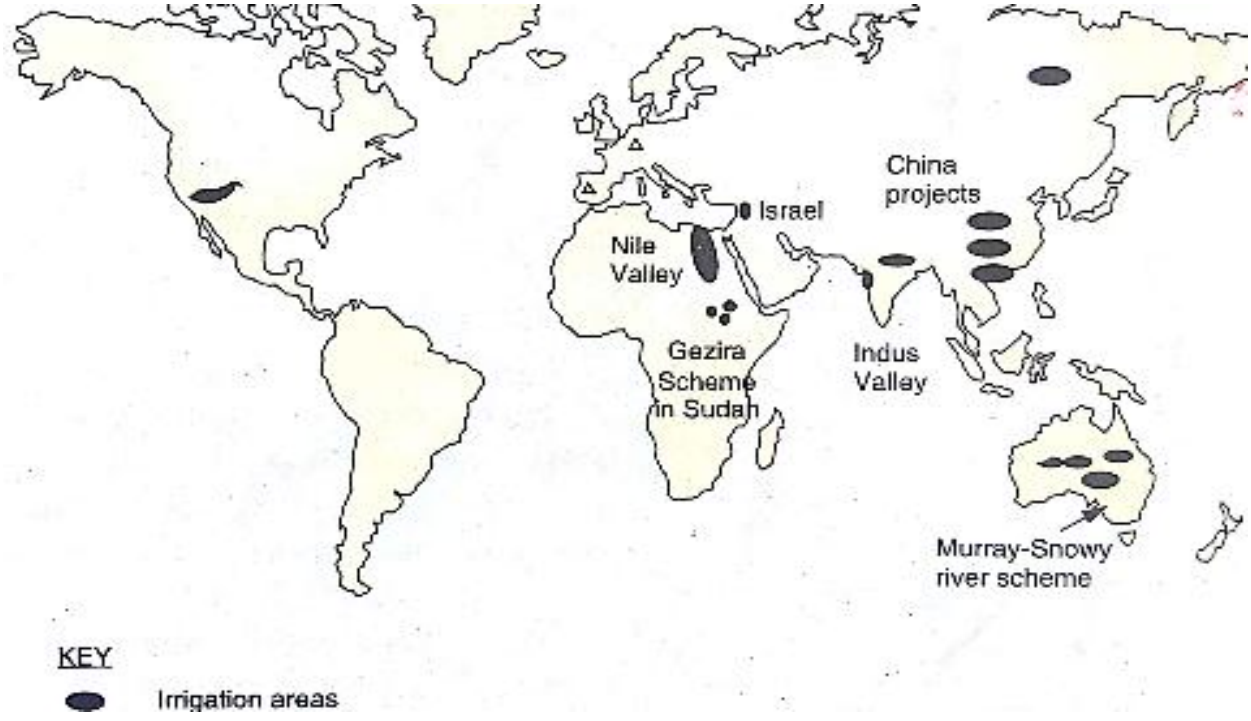
FACTORS THAT ENCOURAGE IRRIGATION (CONDITIONS THAT NECESSITATE IRRIGATION) FARMING

- ✓ **Dry areas**
- ✓ **Variable rainfall or unreliable rainfall.**
- ✓ **Large supplies of fresh water:** This provides a reliable water supply for several harvests even if rain does not fall.
- ✓ **Flat or gentle slopes:** This makes it easy to spread the water evenly into the field. Flat lands also hold water and allow it to infiltrate into the soil.
- ✓ **High population density:** This promotes intensive farming to produce enough food.
- ✓ **Impervious clay soils:** This helps to prevent percolation.

AREAS WHERE IRRIGATION IS DONE IN THE WORLD

- ➢ Nile valley
- ➢ Murry Basin (South East Australia)
- ➢ Central Valley of California
- ➢ Indus Valley (in India)
- ➢ Israel
- ➢ Gezira (in Sudan)
- ➢ Nchalo (in Malawi)
- ➢ Hwangho (in China)
- ➢ Yangtse Kiang (in China)
- ➢ Si Kiang Irrigation Scheme (in China)
- ➢ Aswan Dam project (in Egypt)
- ➢ C.I.S. (Russia)
- ➢ Grand Gulee, Snake, Sacramento and San Joaquin Schemes in North America.

Location of the Major Irrigation Areas in the World



METHODS OF IRRIGATION

1) **Surface irrigation:** Here, water moves over and across the land surface by gravity flow in order to infiltrate and wet the soil.

   EXAMPLES OF SURFACE IRRIGATION

   - ✓ Flood irrigation
   - ✓ Furrow irrigation
   - ✓ Trickle or drip irrigation

2) **Overhead irrigation:** Pressure is used to pump water through pipes which spread water droplets above the crop canopy to stimulate rainfall.

   EXAMPLE OF OVERHEAD IRRIGATION

   - ✓ Sprinkler irrigation

NOTE: These irrigation methods are further classified into traditional and modern methods.

a) TRADITION METHODS

i. Basin (flood) irrigation

- ➢ Water is held on the land in shallow basins surrounded by banks. Used in rice fields.

Advantages of flood (basin) irrigation

- ✍ Crops get sufficient water.
- ✍ It is cheap since it does not need technical skills.

Disadvantages of flood irrigation

- ✍ It wastes a lot of water.
- ✍ It encourages soil erosion.

ii. Furrow irrigation

- ➢ Water is distributed to a piece of land by a network of furrows.
- ➢ It is commonly used on cotton fields.

Advantages of furrow irrigation

- ✓ It is relatively cheap.
- ✓ Large areas are irrigated at the same time.

Disadvantages of furrow irrigation

- ✓ A lot of water is lost during run off.
- ✓ It is difficult to move farm equipment in the furrows.
- ✓ It is expensive to construct the furrows.
- ✓ It is difficult to regulate uniform distribution of water to the crops.

iii. Perennial irrigation

- Water is distributed by a network of canals and ditches leading from a river throughout the year.

b) MODERN METHODS

iv. Overhead (Sprinkler) irrigation

- Water is supplied to plants by water-scattering devices called sprinkler.

ADVANTAGES OF SPRINKLER IRRIGATION

- ☞ It does not waste much water due to uniform water distribution.
- ☞ It does not require much leveling of land since pressure is used to pump water.
- ☞ It allows uniform application of fertilizer and pesticides with water.

DIADVANTAGES OF SPRINKLER IRRIGATION

- ✍ It is expensive to set up and maintain.
- ✍ A lot of water may be lost during strong windy days and high temperatures.

v. Trickle irrigation (or Drip irrigation)

- Water is directly distributed to plant stations by pipes, which may be laid on the ground or buried along their root lines.
- Perforations (tiny openings) are made in the pipes and one perforation supplies water directly to one plant station.

ADVANTAGES OF TRICKLE (DRIP) IRRIGATION

- ☞ It is very efficient since it saves water.
- ☞ Via the drippers, fertilizer can be applied together with water. This saves labour costs.
- ☞ Loss of nutrients due to leaching is reduced since water and fertilizer is supplied directly to the planting station.
- ☞ If is very easy to irrigate in sandy soils where flood irrigation cannot be used.
- ☞ Weeds do not spread because water only reaches the planting station.

DISADVANTAGES OF TRICKLE (DRIP) IRRIGATION

- ✓ It is expensive to set up and maintain.
- ✓ It requires special technical knowledge to successfully operate.

CHALLENGES (PROBLEMS) ASSOCIATED WITH IRRIGATION (PROBLEMS FACING IRRIGATION FARMING)

FARMING

- ❖ Los of soil fertility caused by leading and soil erosion.
- ❖ Spread of water-borne diseases.
- ❖ Theft and vandalism of irrigation equipment.
- ❖ Siltation of dams due to soil erosion.
- ❖ Loss of water through leakage of irrigation pipes and evaporation.

- ❖ Salinisation as the water evaporates which promotes formation of hard pans.
- ❖ High cost of production since irrigation equipment are expensive to set up and maintain.
- ❖ Water pollution from industrial and domestic wastes makes water unsafe for plant life.
- ❖ It promotes water logging, which leads to suffocation of plant roots.

SOLUTIONS TO CHALLENGES FACING IRRIGATION FARMING

- ✍ Recycling irrigation water from plots of land back into the irrigation system.
- ✍ Using efficient irrigation methods such as drip irrigation that save water.
- ✍ Afforestation to promote rain formation.
- ✍ Proper waste management to prevent water pollution and maintain water quality.
- ✍ Reusing of water to meet the water requirements.

AREAS WHERE IRRIGATION IS PRACTICED IN MALAWI

- ☞ The Lower Shire Valley (Nsanje and Chikhwawa).
- ☞ Plains of NKhotakota and Salima.
- ☞ Lake Chilwa-Phalombe plains (Zomba, Phalombe and Machinga).
- ☞ Plains along the shores of Lake Malawi (Karonga, Nkhatabay-Limphasa river flood plain).

THESE AREAS HAVE THE FOLLOWING CONDITIONS TO PROMOTE IRRIGATION FARMING

- ❖ Have fertile soils due to deposition of nutrients by floods.
- ❖ They have plenty of water for irrigation even during the dry season.
- ❖ They have low food production due to frequent floods and droughts.

PROBLEMS FACING IRRIGATION IN MALAWI

a) Lack of political will to promote small irrigation dams: Government provides less funding to small irrigation schemes.

b) Over-dependency on donors for development programmes: This negatively affects sustainability of the projects when the funding is pulled out or it phases out.

c) Limited local ownership of irrigation schemes: This promotes vandalism of irrigation scheme equipment.

d) Siltation of water bodies: Some irrigation methods such as furrow and flood irrigation promote siltation of water bodies.

e) Inappropriate and inefficient irrigation technologies: This makes farmers lose irrigation water through evaporation and leakage of irrigation pipes.

f) Depletion of fresh water resources: This is a big problem resulting from persistent droughts and water pollution.

WAYS OF IMPROVING IRRIGATION IN MALAWI

- Investment in irrigation development at smallholder level.
- Rehabilitation of existing irrigation schemes and establishing many others.
- Training farmers on proper land and water management practices.
- Putting in place mechanisms to monitor water logging and salinity of irrigation schemes.
- Encouraging organic farming, limited use of agro-chemicals to minimize water pollution.
- Awareness training on further processing or reusing of agricultural wastes.

CHARACTERISTIC FEATURES WHICH MAKE IRRIGATION INTENSIVE

✓ Yield fluctuation from year to year is reduced.
✓ Continuous cultivation becomes possible.
✓ In most cases the land holdings are small.
✓ High yields per hectare are possible.
✓ Double or tremble cropping may be achieved.

CASE STUDY 1: IRRIGATION FARMING IN ISRAEL

- Israel covers 20 440 square kilometres, and half of this is a desert and 440 square kilometres is covered by water. It is located to the South Western part of Asia.

THE MAIN REGIONS IN ISRAEL

a) Mediterranean Coastal Plains

✓ This is flat and fertile.

b) Hilly Country

✓ This is bounded by Galilee, Judea Hill in the centre and Jordan Valley to the east.
✓ This region is badly eroded.

c) The rift valley

✓ It extends from north to south of the country, covering the Sea of Galilee, River Jordan and the Dead Sea.
✓ The shore of Dead Sea is the lowest land area on earth, about 400 metres below the sea level.

d) Negev Desert in the South

✓ This region is hot and dry; it receives no rainfall from May to October.
✓ Irrigation is a necessity here.

FACTORS THAT PROMOTE IRRIGATION FARMING IN THE NEGEV DESERT

1) To increases businesses and employment opportunities.
2) To combat desertification in the Negev and other dry lands of Israel.
3) To increase food production for the ever growing population.
4) To attract settlements in the region. This eases population pressure along the Mediterranean coast due to the country's increasing population.

THE MAIN SOURCE OF WATER FOR IRRIGATION IN ISRAEL

i. Yarkon River

ii. Lake Kineret (also called Sea of Galilee or Lake Tiberias).

Importance of using the Sea of Galilee as the source of water for irrigation

- This has fresh water which is suitable for irrigating crops.
- It is reliable since the water level in the lake does not fluctuate.

Problems of using Sea of Galilee as a source of water for irrigation in the Negev Desert

- It is about 210 metres below the sea level. This increases the cost of pumping water.
- Droughts and heavy pumping have increased its depth below the sea level.

iii. Dead Sea

- This water is saline, it needs desalination.
- It is the saltiest (about 34% saline) body of water in the world.

iv. Groundwater (aquifers)

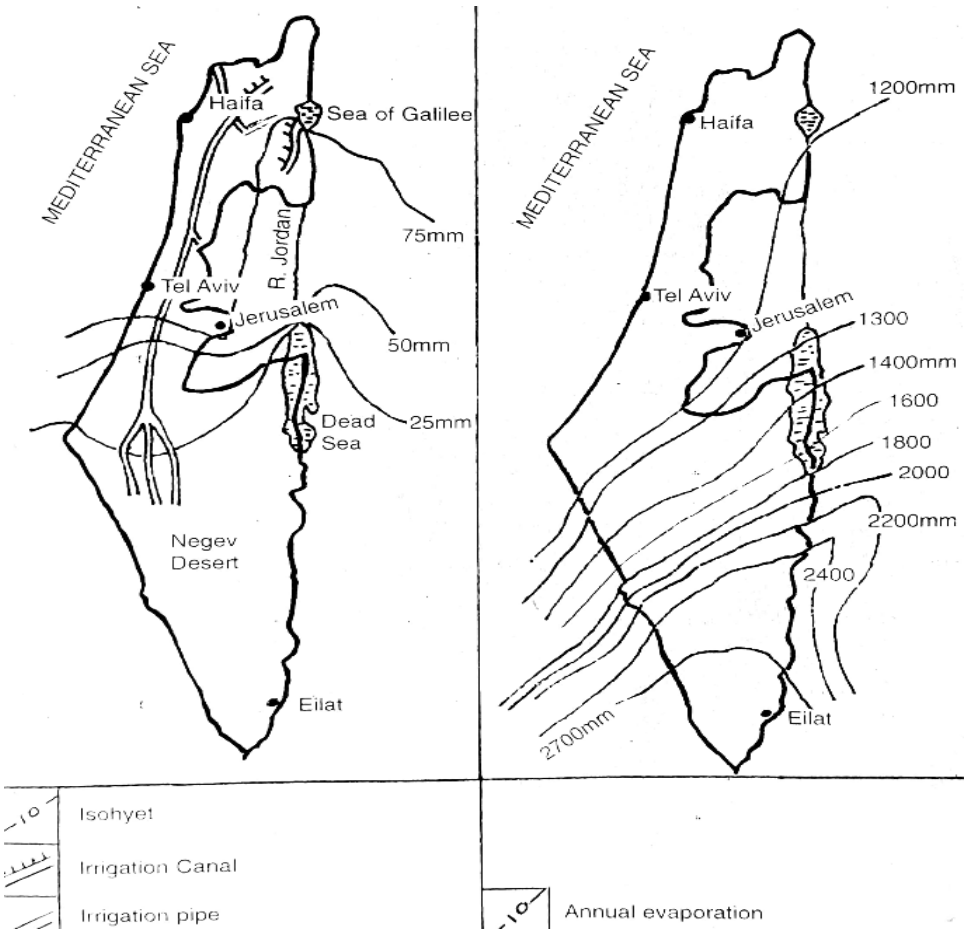
- This water is tapped by wells.

REASONS FOR ISREAL'S WATER SHORTAGES

- Droughts
- Over-consumption due to high population.

- Canals and pipelines lead water from these water sources, southwards to the Negev Desert.
- Pipelines reduce the loss of water through evaporation due to high temperatures

Location of Israel on the World Map, and Map of Israel



THE RELIEF, SOIL AND CLIMATE OF ISRAEL

1) SOIL

- The Mediterranean coastal plains are very fertile and flat.
- But the hilly country to the east and north east is infertile due to great erosion.
- The Negev desert in the south has poor, arid, shallow and sandy soils. It has lost fertility due to leaching.

2) RELIEF

- The western region (Mediterranean coastal plains), the Negev Desert, Jordan River Valley are flat while the central part is at a high altitude (around Judea hill).
- Lake Kineret is 210mm below the sea level.

3) CLIMATE

- The region is hot and dry because of the Negev Desert which covers up to 65% of Israel.
- This promotes high evaporation rates in the Negev Desert but sometimes the vapour fails to condense due to high temperatures.
- There is low rainfall in the Negev Desert. The north and western parts receive good Orographic (relief) rains influenced by onshore winds from Mediterranean Sea.
- Negev region has dry summers and wet winters.
- Negev has annual rainfall of less than 25mm, and annual evaporation is up to 2700mm.
- In Galilee region annual rainfall exceeds 75mm, has dry summers and wet winters.
- The central or hilly country is semi-desert, with annual rainfall of 25-75mm and 1200-1400 evaporation.

EXAMINATION OF HOW RELIEF, SOIL, CLIMATE AND SALINITY HAVE DISCOURAGED IRRIGATION FARMING IN ISRAEL

a) SOIL

- The soil is highly eroded in the hilly country and there is a lot of leaching in the Negev Desert.
- In addition, poor sandy soils in the Negev Desert discourage irrigation because water is lost at a fast rate.

SOLUTIONS TO THESE PROBLEMS

i. Manure and fertilizer application to improve soil fertility.
ii. Afforestation and re-afforestation to reduce run-off to prevent soil erosion and loss of soil fertility.

b) SALINITY

- Irrigation makes the soil to be water-logged. This brings dissolved salts near the earth's surface and this negatively affects the roots of plants.
- Evaporation also leaves salts on the earth's surface, and when irrigation is done, plants that do not tolerate salts die.
- Furthermore, the Dead Sea has a lot of salts. It is very expensive to desalinate the water from this sea.

SOLUTIONS TO THE PROBLEM OF SALINITY

i. Desalinating the water before irrigation is done.

ii. Constant draining away of salts from water which percolates downwards.
iii. Application of lime to neutralize the salts.

c) RELIEF

- The Hilly Country discourages irrigation due to steep slopes.
- The Hilly Country also promotes relief rainfall that causes a lot of soil erosion which leads to loss of soil fertility.

SOLUTION TO THE PROBLEM OF RELIEF

i. Afforestation and re-afforestation to reduce soil erosion and promote infiltration.

d) CLIMATE

- High temperatures in the Negev Desert promote a lot of evaporation. This area needs frequent irrigation.

SOLUTION TO THE ABOVE PROBLEM

i. Carry water from the Sea of Galilee in the north to the rain-starved regions in the centre and south using pipes.
ii. Control climate change through afforestation and re-afforestation that help to absorb green-house gasses in the atmosphere, such as carbon dioxide.

METHODS OF IRRIGATION IN ISRAEL

1) Trickle irrigation (or Drip irrigation)

- Water is directly distributed to plant stations by pipes.
- Perforations are made in the pipes and one perforation supplies water directly to one planting station.
- The **advantage** of this method is that it saves water.

2) Buried irrigation

- The pipes that bring water to the plants are buried in the soil to reduce the loss of water through evaporation.

3) Canal irrigation

- The northern section is made up of tunnels and open canals because this region is rainy and cool.

4) Sprinkler irrigation

- Water is supplied to plants by water-scattering devices called sprinkler.
- This is less efficient because it does not save water.

CROPS GROWN UNDER IRRIGATION

i. Tomatoes	vii. Cotton	xiii. Watermelons
ii. Sunflower	viii. Pears	xiv. Green peas
iii. Grapes	ix. Spring potatoes	xv. Beans
iv. Sugar beets	x. Wheat	xvi. Corn
v. Citrus fruits	xi. Chick peas	
vi. Apples	xii. Groundnuts	

PROBLEMS (CHALLENGES) FACED IN SOURCING IRRIGATION WATER IN ISRAEL

1) Insufficient sources of water to meet the increasing demand.
2) Leakage of irrigation pipes leads to loss of a lot of water.
3) High salinity of the water makes it unsuitable for irrigation
4) Hostile Arabs who would not like to see Israel use Jordan River.
5) It is very costly to pump water from Lake Tiberias which is 210 metres below the sea level.
6) Evaporation rates in the Negev Desert region are very high.
7) Most of the soil in the desert is sandy. This does not retain water.

HOW FRESH WATER IS OBTAINED FROM SALTY (SALINE) WATER (OR HOW SALINE WATER IS DESALINATED)

- **Vacuum Freezing Method**
- **Evaporation (Distillation) Method**
- **Reverse Osmosis Method**

- There are water desalination plants at Haifa and Eilat.
- At Haifa, they use a desalination process called vacuum freezing.

A. HOW WATER IS DESALINATED USING A VACUUM FREEZER

Sea water is cooled and put into a freezing chamber where the water forms a thin mixture of liquid water and ice particles. This mixture is separated and ice crystals are washed to remove the brine (salty water). Finally, the ice particles are melted to give fresh water.

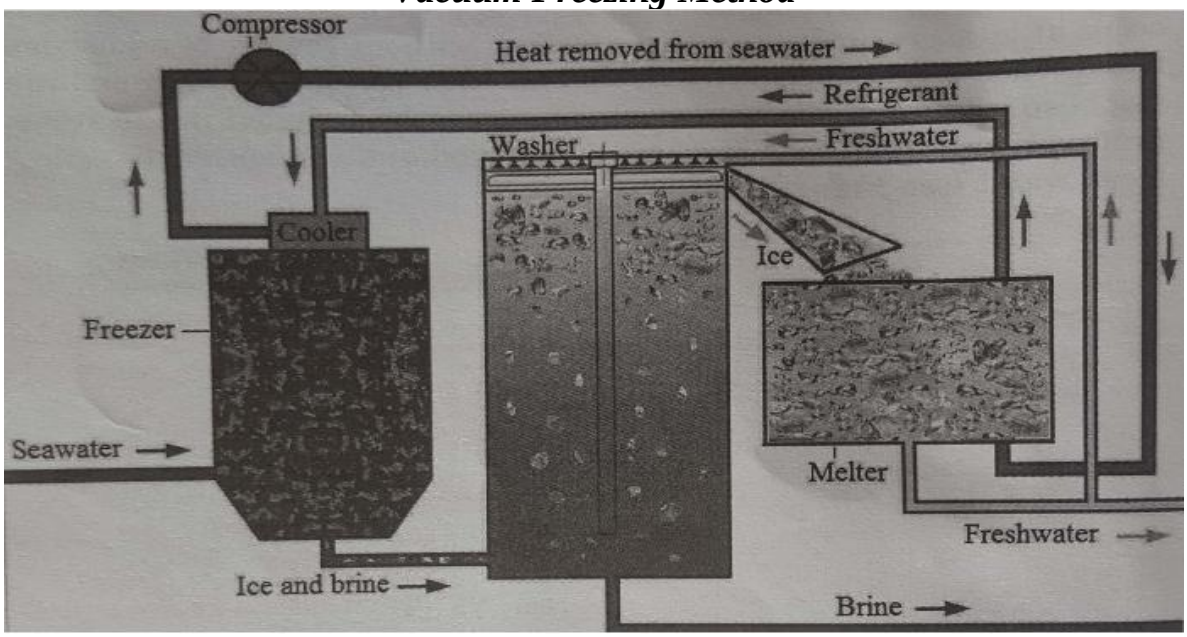
DISADVANTAGE OF THE VACUUM FREEZING METHOD

- ✓ It has low energy requirements.
- ✓ It has less potential for corrosion and salt precipitation.

DISADVANTAGE OF THE VACUUM FREEZING METHOD

- ✓ Some salts which may still be harmful to crops remain in the water after desalination.
- ✓ It is expensive since it uses advanced technology.
- ✓ The desalination plant takes up land that could be used for other purposes such as farming.
- ✓ It leads to ecological imbalance due to chemical output of the plants returned to the sea.

Vacuum Freezing Method



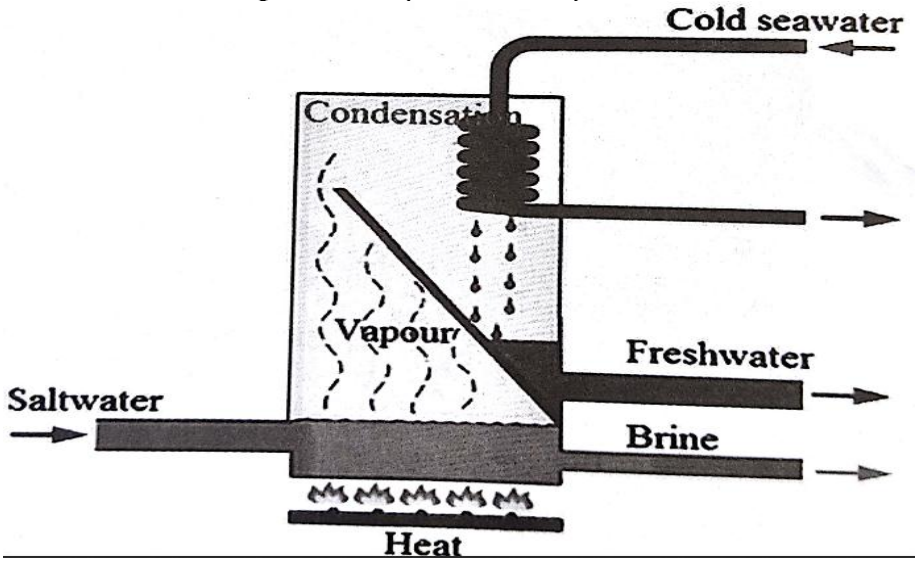
B. EVAPORATION (DISTILLATION) METHOD

Large quantities of saline sea water are brought to huge tanks where the water is heated. The steam (vapour) is produced and channeled out through pipes into huge tanks where the vapour condenses into liquid water. The salts remain as a residue in the first heated tank.

DISADVANTAGES OF (EVAPORATION) DISTILLATION METHOD

- ✓ The water loses all the valuable salts (including mineral salts needed by plants).
- ✓ The construction of the desalination plant is very expensive.

Evaporation (distillation) Method



C. REVERSE OSMOSIS

In this process, salty water is pressed against membranes which allow only water to pass through while preventing passage of salts. Water remaining in the solution is brine and is returned to the sea or disposed of.

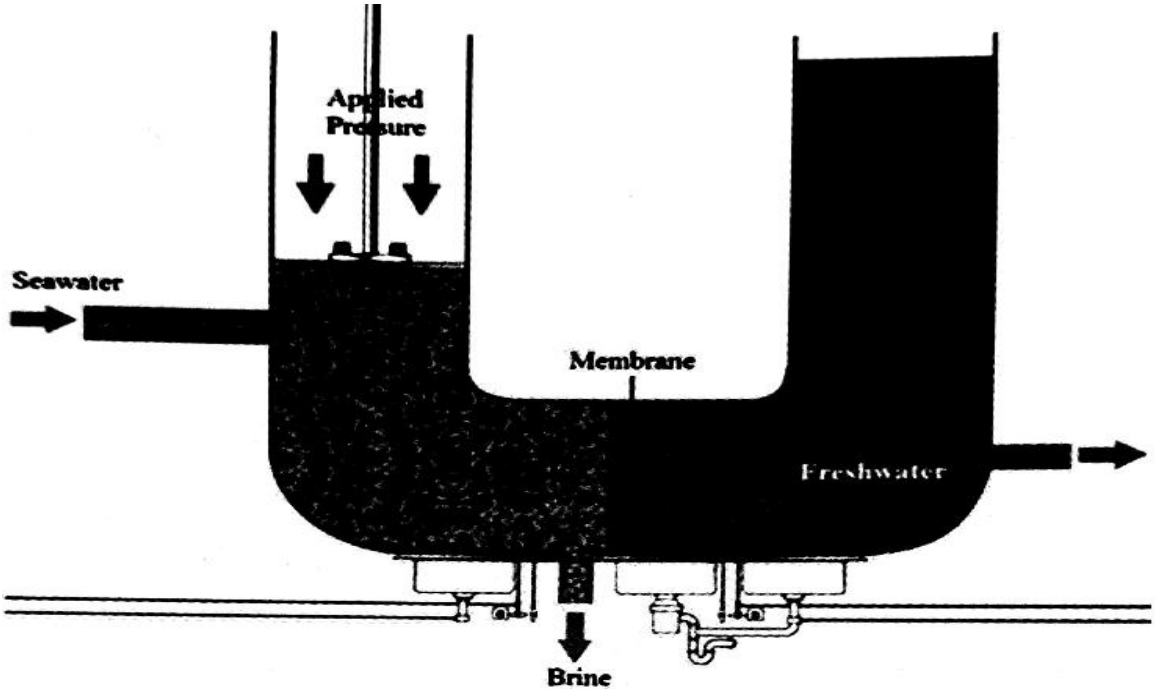
ADVANTAGES OF REVERSE OSMOSIS PROCESS

- ❖ It is cheap since it uses less energy.
- ❖ It is very efficient and supplies a lot of water of high quality.

DISADVANTAGES OF REVERSE OSMOSIS PROCESS

- ❖ It is expensive since it uses sophisticated technology.
- ❖ The membrane is easily blocked due to the buildup of residues.

Reverse Osmosis Process



ENVIRONMENTAL EFFECTS OF WATER DESALINATION

a) Ecological damage due to the brine and chemicals from desalination plants.
b) Pollution resulting from the brine and chemicals from desalination plants.
c) Health risks since there are no necessary minerals in desalinated water.
d) Exploitation of non-renewable energy resources. Some desalination plants use non-renewable energy sources such as fossil fuels.

THE NATIONAL WATER CARRIER (KINNERET-NEGEV CONDUIT)

☞ It is an extensive system of giant underground pipelines and canals, reservoirs, and large scale pumping stations that convey water from Lake Kinneret to Israel densely populated coastal region and the Negev Desert.

THE PURPOSES OF CONSTRUCTING THE KINNERET CONDUIT

- To supply water to the entire Israel population for domestic uses.
- To ensure delivery of water for irrigation to the Negev Desert.
- To recharge the underground aquifers in the coastal region.
- To provide an outlet for surplus water from the north in winter and spring.

CASE STUDY 2: THE NCHALO SUGAR IRRIGATION SCHEME IN MALAWI

- It is located 16°10' south of the equator and 34°53' longitude east of the Greenwich Meridian.
- It is in Chikwawa district, near Shire River.

RELIEF, SOIL, CLIMATE AND LABOUR AT NCHALO

a) RELIEF

- The area is very flat which promotes mechanization and irrigation to take place easily.

b) SOIL

- Rich, well-grained alluvial and clay soils of which there are two types:
  i. Calcimorphic
    - ✓ This soil is gray to dark brown alluvial.
  ii. Hydromorphic
    - ✓ This is clay soil, with a strongly developed, coarse blocky structure.

c) CLIMATE

i. Rainfall

- ✓ The area receives 500mm-800mm per year. This is less than the required amount of 2000mm per year.
- ✓ This is supplemented by irrigation.

ii. Temperature

- ✓ It experiences temperatures between 20°C and 32°C throughout the year.
- ✓ These temperatures fall to the required temperature of 21°C-30°C to enable canes grow properly and promote evaporation before harvesting to increase sugar concentration levels in the canes.
- ✓ A dry warm season is needed before harvesting.

d) LABOUR

- Labour is abundantly available due to high population in the area.

GENRAL FAVOURABLE CONDITIONS FOR THE GROWTH OF SUGARCANES

i. Temperatures between 21°C and 27°C throughout the year. A sunny dry period just before harvesting is ideal for the concentration of sugar in the canes.
ii. Rainfall of about 1270mm if not under irrigation. Too much rainfall dilutes the sugar and lowers the yield.
iii. Water-retentive, deep fertile soils.
iv. Flat topography to facilitate mechanization especially during harvesting and to promote irrigation.
v. A large supply of cheap labour, especially during harvesting.

SOURCES OF WATER

- ✓ Shire River is the only source of water for irrigation at Nchalo Sugar Irrigation Scheme.

METHODS OF IRRIGATION AT NCHALO SUGAR IRRIGATION SCHEME

1) SPRINKLER IRRIGATION

- This uses specially designed sprinklers to supply water to the whole field.

2) CANAL IRRIGATION

- Irrigation canals (drainage canals) are dug to direct water from Shire River to the cane fields.

HARVESTING SUGARCANES

- Before the sugarcanes are cut from the fields, the cane fields are set on fire.

REASONS WHY THE SUGARCANE FIELDS ARE SET ON FIRE BEFORE HARVESTING

- ✓ To scare away wild animals such as snakes and rats that may harm the workers.
- ✓ To increase the sugar concentration in the canes
- Harvesting is then done by cutting the canes with long panga knives.

- After cutting, the canes are loaded on light railways or tractors and taken to the factory for processing into sugar.

PROCESSING CANES INTO SUGAR

Stage 1

- At the factory the canes are cut into shorter pieces.

Stage 2

- The shorter pieces of cane are crushed by putting them on rollers to extract (squeeze out) the sugar juice.

Stage 3

- The extracted juice is boiled and later mixed with lime to prevent fermentation. During boiling, the water evaporates from the juice.

Stage 4

- After the water evaporates, the rest is left to crystallize (cools and solidifies) into brown sugar which is called raw sugar.
- **Molasses** (thick syrup) are then produced as a by-product.

Stage 5

- When white sugar is required, the syrup is filtered to remove solid impurities and then run into char or bone charcoal-packed cylinders.
- The char absorbs the brown colour. The sugar, now white, is evaporated by heating and condensed to produce white sugar.
- The residual is golden syrup called **bagasse**.

THE USE OF MOLLASES AND BAGASSE

a) Molasses are used for:

i. Making alcohol
ii. Making spirit rum
iii. Making treacle
iv. Making animal feed after mixing with other substances

b) Bagasse is used for:

i. Making paper
ii. Making fibre boards
iii. An manure in fields
iv. As fuel in sugar factories
v. As feed for animals

EXPLANATION ON HOW SUGAR IS MADE FROM SUGARCANES

At the factory, the canes are cut into shorter pieces. These are crushed by putting them on rollers to extract the sugar juice. The extracted juice is boiled and later mixed with lime to prevent fermentation. During boiling, the water evaporates from the juice. After the water evaporates, the rest is left to crystallize into brown sugar which is called raw sugar. Molasses are then produced as a by-product.

When white sugar is required, the syrup is filtered to remove solid impurities and then run into char. The char absorbs the brown colour. The sugar, now white, is evaporated by heating and condensed to produce white sugar. The residual is golden syrup called bagasse.

PROBLEMS FACED BY THE NCHALO SUGAR IRRIGATION SCHEME

1. High cost of investment and production

- It is very expensive to buy and maintain machinery to be used at the farm and factory.

SOLUTION

- Growing a lot of sugarcanes of high quality to increase the production of sugar to be exported and fetch a lot of money.

2. Theft of the irrigation aluminium pipes

- This is done by disgruntled community members around Nchalo Sugar Irrigation Scheme and factory.

SOLUTION

- Improving security by employing many guards.
- Tightening community policing around the scheme.
- The community members should be reporting to relevant authorities such as the police any person found stealing equipment from the scheme.
- Civic education to the people around the scheme on the importance of protecting property belonging to the scheme.

3. Poor waste disposal

- The company discharges most of the wastes into Shire River, this leads to water pollution.
- Water pollution leads to the death of aquatic animals and makes the water unsafe for domestic use.

SOLUTION

- Proper waste disposal.
- Some of the wastes can be changed to other useful products.
- Removing poisonous chemicals from wastes before discharging them into water bodies.
- Legislation that protects water bodies from pollution.

4. High degree of salinity

- Salts build up in the irrigated areas after evaporation takes place.
- Irrigation makes the soil to be water-logged. This brings dissolved salts near to the earth's surface since the water table rises and this negatively affects the roots of plants.

SOLUTION

- Application of lime to neutralize the salts.

5. Inadequate drainage in some parts of the estate

SOLUTION

- Construction of drainage canals.

6. Insufficient irrigation in some parts of the estate

SOLUTION

- Constructing more irrigation canals.

IMPORTANCE OF NCHALO SUGAR IRRIGATION SCHEME TO THE ECONOMY OF MALAWI

a) Source of employment to many people especially during planting, weeding and harvesting of canes.
b) Source of foreign exchange earnings after exporting sugar.
c) Source of government revenue through taxation.
d) Source of food in the form of sugar.

e) Provision of raw materials for making animal feed, alcohol, fuel and manure.
f) It has led to the development of the areas surrounding Nchalo.

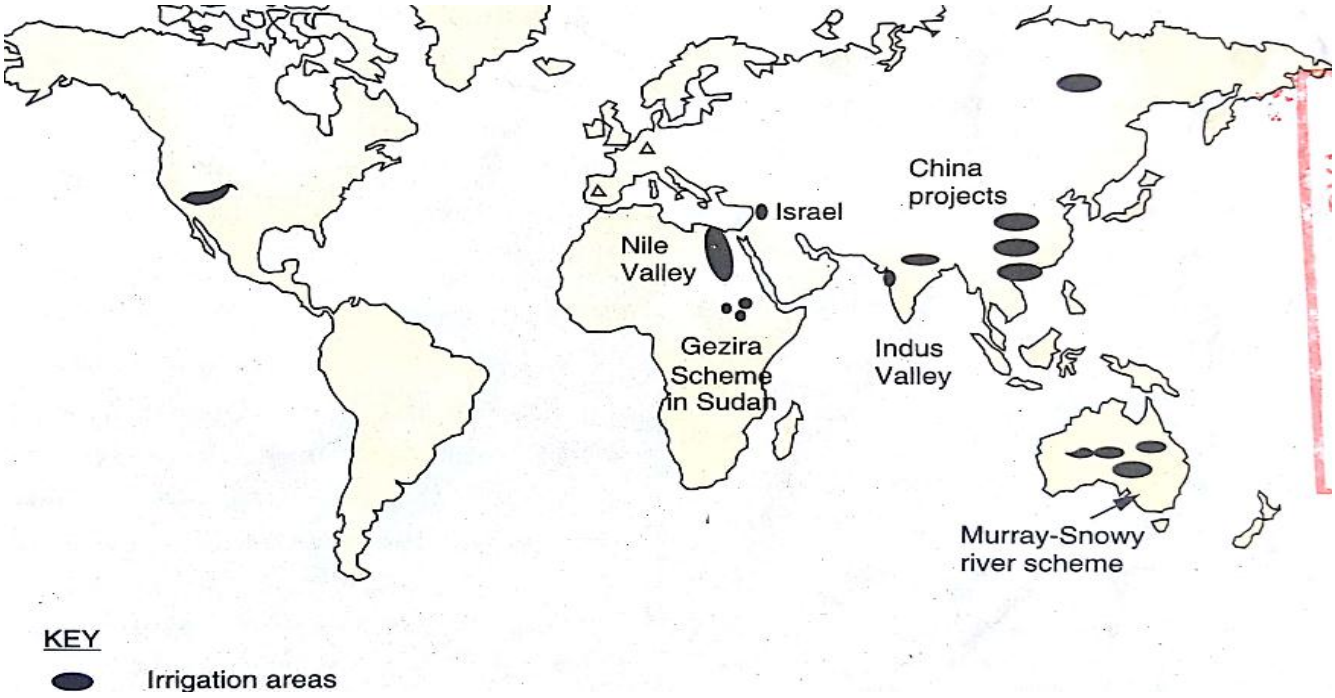
PLANTATION AGRICULTURE

- ❖ It means the specialized commercial cultivation of perennial crops on a large area of land.
- ❖ Perennial crops are those that last for more than two growing seasons, either drying back after each season or growing continuously.
- ❖ It is usually done on estates.
- ❖ An estate is a large plantation operated by a planter commanding a large number of paid workers.

CROPS GROWN UNDER PLANTATION FARMING

CROP	WHERE IT IS DONE
✓ Bananas	➢ West Africa, Latin America, Jamaica.
✓ Cocoa	➢ Brazil, Nigeria, Ivory Coast, Ghana, Gabon.
✓ Coffee	➢ El Salvador, Angola, Brazil, Uganda.
✓ Coconut	➢ Malaysia, India, Indonesia, Philippines.
✓ Rubber	➢ Liberia, Sri Lanka, Indonesia, Malaysia.
✓ Sisal	➢ Tanzania, Uganda, Madagascar, Kenya.
✓ Sugarcane	➢ All tropical regions.
✓ Tea	➢ India, Sri Lanka, Kenya, Malawi, Mozambique.
✓ Oil Palm	➢ West Africa (Ghana and Nigeria), Malaysia, Zaire, Indonesia.

Location of Plantation Farming on the World Map



CHARACTERISTICS OF PLANTATION AGRICULTURE

- It is done on large farms.
- It requires heavy capital outlay.

- The use of scientific management.
- Foreign ownership and local labour.
- Estates have facilities that process crops.
- It is monocultural (only one crop is grown).
- It is export oriented.
- Lengthy time-lag between planting and the first harvest.

ADVANTAGES OF PLANTATION AGRICULTURE

i. Regular supplies of produce.
ii. Provision of raw materials.
iii. Source of foreign exchange earnings after exports.
iv. Good quality crops are produced.
v. The crops shed the soil thereby conserving water and soil.
vi. Labourers are trained in various aspects of plantation agriculture.
vii. Harvesting is done quickly, efficiently and cheaply.
viii. The organization ensures that there is no wastage since the waste is used as fuel or fertilizer.
ix. The work is simplified by employment of many workers.
x. Knowledge of cultivation is gained by workers who can also open their own farms.

DISADVANTAGES OF PLANTATION AGRICULTURE

- ✓ Farmers suffer a lot when prices fluctuate since it requires high cost of production.
- ✓ It takes a long time before the profits are realized.
- ✓ Delays in processing the crop would lead to loss of value.
- ✓ Local people may be exploited as cheap labour, leading to slavery.
- ✓ They depend on the availability of cheap labour which may not always be available.
- ✓ Being monocultural in nature, diseases spread easily.
- ✓ Water pollution resulting from the discharge of effluents by the processing factories.
- ✓ Heavy rainfall leads to rapid deterioration of the soil through leaching. This necessitates heavy application of fertilizer.
- ✓ They are prone to climatic hazards such as droughts, frosts, winds, and for the workers, heat and high humidity sap their energy.

CASE STUDY 1: TEA PLANTATION IN MALAWI

BACKGROUNG

- ❖ Tea is a perennial crop that originated from China where it grew naturally.
- ❖ China is the leading producer of tea, followed by India, Kenya, Sri Lanka and Turkey.
- ❖ Britain is the leading consumer of tea in the world (supplied by Kenya).

AREAS WHERE TEA IS GROWN IN MALAWI

1. Mulanje
2. Thyolo
3. Nkhatabay

FAVOURABLE CONDITIONS FOR TEA GROWING

a) CLIMATE

i. Temperature

- Thyolo, Mulanje and Nkhatabay experience temperatures ranging from 18°C to 30°C with little or no frost.
- These temperatures enable tea to grow properly.

ii. Rainfall

- These areas receive high rainfall of about 1200 mm to 2400 mm per year.
- This rainfall amount enables tea bushes to grow properly.

b) SOIL

➢ These areas have loamy, well-drained soils, on higher altitudes.

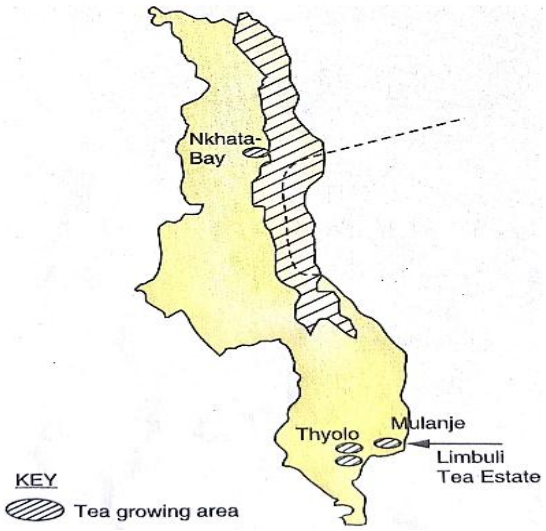
c) HUMIDITY

➢ Humidity (amount of moisture in the air) is high due to high evaporation rates. This helps in the formation of dew which makes tea-growing to be continuous.

d) LABOUR

➢ There is availability of abundant and cheap labour due to high population.

Tea-Growing areas in Malawi



CULTIVATION OF TEA

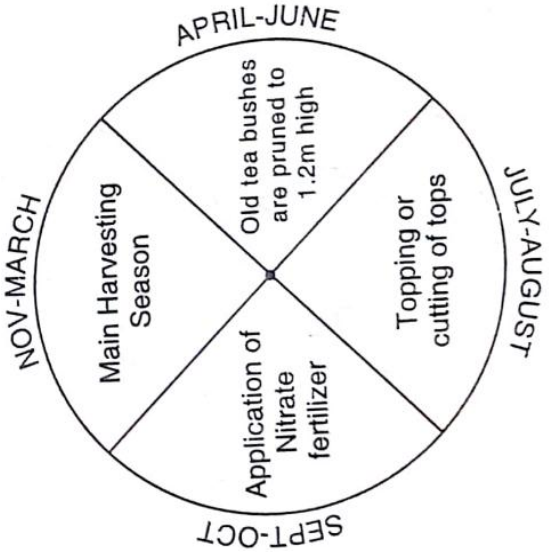
1) BY DIRECT PLANTING OF SEEDS

- The seeds are germinated in wet sand where the seedlings are transplanted into nurseries.
- When seedlings are one year old, they are transplanted to open fields and planted in rows.
- They are ready for harvesting after the second year.

2) BY USING CUTTINGS

- Cuttings made from the best clones are planted in rows on the plantation.

The Cycle of activities on the Tea Plantation



REASONS FOR TOPPING AND PRUNING

a. To obtain a flat plucking surface.
b. To ensure a thick growth of branches (to stimulate the growth of new shoots).
c. To keep branches at the height of 1.5 metres.
d. To maintain a healthy frame.
e. To prevent flowering and fruit formation.

NOTE: ***Topping and pruning are done during the first four years. Weeding is done throughout the year just before fertilizer application.***

THE COMMON DISEASE FOR TEA

- Armillaria

COMMON PESTS FOR TEA

- Heleopeltis
- Thrips

HARVESTING OR PICKING TEA

- Tea is mainly harvested from November to March.
- During this period, the estate employs over 1800 workers, with some living on the estate in estate compounds.
- In harvesting tea, two top leaves and a bud are plucked because it is these which have a high tannic acid concentration that gives the tea its flavour.
- After the harvest, the leaves are taken to the factory for processing.

TYPES OF TEA

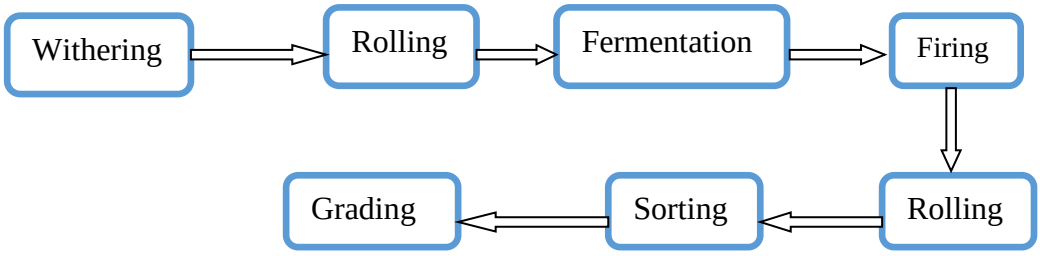
a) Black Tea
b) Oolong Tea
c) Green Tea

PROCESSING BLACK TEA

The fresh leaves are withered by putting them into troughs through which hot air is blown to reduce the moisture content by half and make them soft. Then the leaves are rolled or cut into small pieces. The rolled leaves are sifted and fermented to reduce tannic acid content. The

chemical reaction in fermentation changes their colour from green to copper. The leaves are then heated (fired) to stop fermentation by reducing the moisture content, making leaves attain a black colour dark brown. Finally, the leaves are rolled again, sorted, graded and packed.

FLOW DIAGRAM ON PROCESSING OF BLACK TEA



PROCESSING OOLONG TEA

This tea is semi-fermented by leaving the tea leaves to dry in the shade for about five hours. Afterwards, they are roasted over a fire, rolled and twisted. The leaves are then re-fired in a bamboo basket for three to twelve hours before packing.

PROCESSING GREEN TEA

- The process is the same as above only that the leaves are not allowed to undergo fermentation process.
  The fresh leaves are withered by putting them into troughs through which hot air is blown to reduce the moisture content by half and make them soft. Then the leaves are rolled or cut into small pieces. Finally, the leaves are fired, rolled again, sorted out, graded and packed.

NOTE: Tea processing requires a lot of energy. This at the estate comes from electricity and wood from blue gum trees around the estate.

THE IMPORTANCE OF SHADE TREES IN THE TEA ESTATE

i. They provide moisture to growing tea bushes.
ii. Fallen leaves rot and add humus to the soil.
iii. They provide shade to tea pickers for resting during harvesting.
iv. They act as wind breakers to avoid damage in the estate.

SMALLHOLDER TEA FARMING

BACKGROUND

- Tea is also grown on small-scale by smallholder farmers in Mulanje and Thyolo.
- There are over 4450 smallholder farmers, managing over 2600 hectares of tea.
- The Smallholder Tea Authority started in 1967.

ROLES PLAYED BY THE SMALLHOLDER TEA AUTHORITY (STA)

a) Marketing of green leaf grown by smallholder farmers.
b) Maintenance of infrastructure such as roads and bridges for easy transportation.
c) Buying of inputs for smallholder farmers.
d) Provision of credit to smallholder farmers.
e) Provision of extension services to the smallholder farmers.
f) Managing tea growers and collects tea from farmers for processing.
g) It pays individual tea growers in line with their quantity of tea leaves produced.

SUCCESS OF THE SMALLHOLDER TEA INDUSTRY

i. It has contributed positively to the Malawi Tea Company (**MATECO**).

ii. It has led to the opening of the tea processing factory at Mulanje Boma in 1975.
iii. Monetary incentives farmers received before 1990 enabled farmers to progress economically and contributed positively towards the tea industry.

FAILURES OF THE SMALLHOLDER TEA INDUSTRY

i. Smallholder farmers are not well paid and not timely paid. This discourages them.
ii. Bonuses are no longer given to farmers. This discourages them.
iii. A large percentage of tea leaves are sold to the tea estates and not to the established Smallholder Tea Authority.
iv. Some farmers have stopped growing tea. The plots of land are now used for other crops.

FUTURE OF THE SMALLHOLDER TEA AUTHORITY

- Unless the welfare of farmers is well taken care of to motivate them, the future of the Smallholder Tea Authority remains uncertain.

WAYS IN WHICH THE SMALLHOLDER TEA AUTHORITY CAN IMPROVE THE WELFARE OF FARMERS

- ✓ Farmers should be well-paid.
- ✓ Farmers should be paid in good time.
- ✓ Re-introduction of bonuses for farmers.

IMPORTANCE OF THE TEA INDUSTRY TO THE ECONOMY OF MALAWI

a) Provision of foreign exchange earnings after exports.
b) Creation of employment for many people.
c) Source of income to farmers.
d) Source of food as a beverage.
e) It has led to the industrial development since factories were established in Malawi.
f) Creation of international relations with consumers of Malawi's tea.
g) Provision of government revenue through taxation.
h) It has led to the development of the districts (Mulanje, Thyolo and Nkhatabay), where the industries are based.

PROBLEMS FACED IN THE TEA INDUSTRY

- Price fluctuation on the world market.
- Pests and diseases which increase the cost of production.
- Rising cost of production.
- Erratic payments to smallholder farmers.

REASONS WHY SMALLHOLDER FARMERS ARE ALLOWED TO GROW TEA

a. Farmers do not require big land since tea is high yielding.
b. The farmers have the tea growing knowledge because they worked on the estates before.
c. To provide alternative sources of income to farmers.

NOTE:

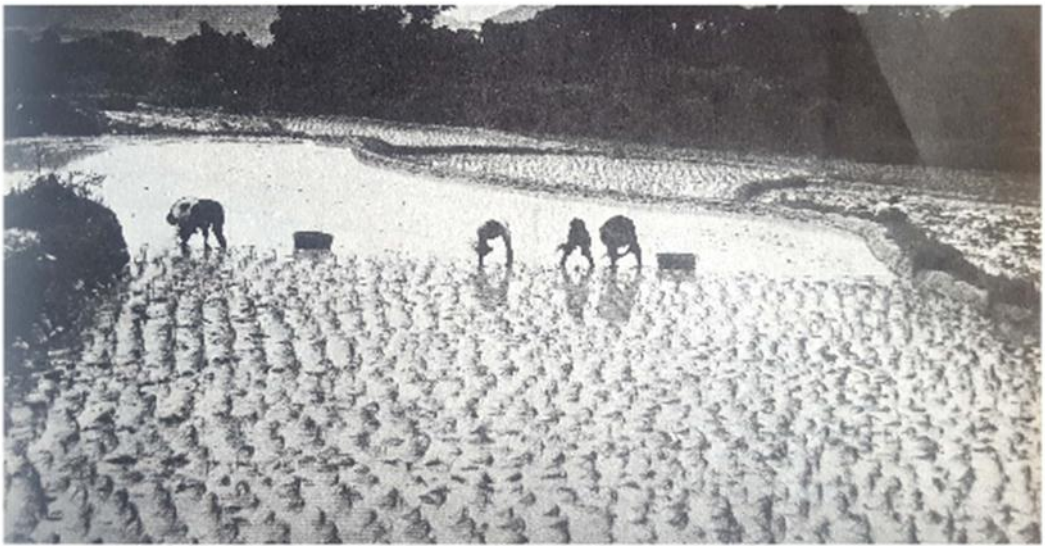
- ✓ 98% of the processed tea in Malawi is exported.
- ✓ Only 2% of the tea is sold locally under various brand names (such as Chombe Tea, My Gold Tea, Chisangalaro Tea, etc.).

COUNTRIES THAT IMPORT TEA FROM MALAWI (OR COUNTRIES TO WHICH MALAWI'S TEA IS EXPORTED)

i. South Africa
ii. Great Britain
iii. Canada
iv. United States of America (USA)
v. Continental Europe

ADDITIONAL DIAGRAMS IN THIS TOPIC

Planting Rice in Japan



Harvesting Wheat by Combine Harvesters on the Canadian Wheatland

TOPIC 2: WORLD POPULATION

DEFINITION OF TERMS

1) POPULATION
- It is the total number of people living in an area at a given time.

2) POPULATION DENSITY
- It is the average number of people living in a unit area (per square kilometre).

3) POPULATION GROWTH RATE
- This is the net addition through birth and migration to the existing population per year.
- This rate is usually expressed as a percentage of the existing population.

4) POPULATION EXPLOSION
- This is when the population grows rapidly.

5) POPULATION IMPLOSION
- This happens when the population decreases sharply.

6) BIRTH RATE
- It is the number of people born in a year every one thousand (1000) people.

7) MORTALITY RATE (DEATH RATE)
- This is the number of people dying in a year per one thousand (1000) people.

8) PUSH FACTORS
- These are negative factors that drive people from some areas.
- Examples of push factors are harsh climate, lack of employments.

9) PULL FACTORS
- These are positive factors attract people to settle in an area.
- Examples of pull factors include fertile soils, good transport, and improved living - conditions.

10) YOUTHFUL POPULATION
- This is the population that is made up mostly of young people because the population growth rate is high.

11) AGEING POPULATION
- This is the population that is composed of adults because the population growth rate is low.

12) POPULATION DISTRIBUTION
- This is the way in which the population is spread out in a particular area.

13) IMMIGRATION
- This is the coming of people into a country or an area from other countries or areas.

14) EMIGRATION
- This is the going out of people from an area to other areas or countries.

15) FERTILITY RATE
- This is the average number of children born alive per 1000 women aged 15-49 in a year.

16) LIFE EXPECTANCY
- This is the number of years a baby is expected to live after birth.

17) DEPENDENCY RATIO

- This is the proportion of the total population of a country in the ages 0-15 and above 64 (64+).
- Dependents are non-working people but depend on the economically active (aged 15-64).

WORLD POPULATION DISTRIBUTION

- The world population distribution is not even at local, regional, national, continental and world levels.
- Some areas are sparsely populated, moderately populated and others densely populated.

FACTORS INFLUENCING WORLD'S POPULATION DISTRIBUTION

i. **Climate:** Poor climates discourage settlements while good ones encourage it.
ii. **Physical relief**: Flat areas promote settlements while steep slopes discourage it.
iii. **Soils:** Fertile soils encourage settlements while poor soils discourage it.
iv. **Mineral resources:** These attract settlements, absence of minerals discourage it.
v. **Government policies on immigration and distribution of settlers:** Good policies encourage settlements while bad policies discourage it.
vi. **Natural disasters:** diseases, pests, floods, earthquakes discourage settlements.
vii. **Political stability:** Wars promote sparse populations while politically stable areas attract settlements.

A. SPARSELY POPULATED AREAS IN THE WORLD

- These are areas with very low populations.
- They include the following:

a. COLD POLAR REGIONS

- These include the following: ***Arctic and Antarctic, northern Canada, Tundra regions of Greenland, Iceland, Siberia and the Northern Finland***.

REASONS WHY THESE AREAS ARE SPARSELY POPULATED

✓ Due to harsh climate (very cold), which discourages settlement
✓ Very low temperatures discourage farming.
✓ Sub soils are permanently frozen (permafrost), this does not support plant growth.

b. HOT AND TEMPERATE DESERTS

- These include the following: ***Kalahari, Atacama, Sahara, The Great Australian Desert, The Mohave desert, Gobi desert, etc.***

c. THE ALPINE REGIONS

✓ These are high mountainous regions.

d. THICK RAINFORESTS

✓ These areas experience equatorial climate.
✓ These include the Amazon Basin Rainforest of Brazil, the Borneo Rainforest of Indonesia and the Congo rainforest of DRC in Africa.

REASONS WHY THESE AREAS ARE SPARSELY POPULATED

✓ Due to harsh climate (very high temperatures), which discourage settlement.
✓ Infertile sandy soils which promote leaching and discourage farming.

✓ Poor communication since abundant sand makes roads and railways impassable.
✓ Poor topography discourage farming and settlements.
✓ Thick forests makes construction of communication lines to be difficult.

B. MODERATELY POPULATED AREAS IN THE WORLD

- This covers the large parts of cool temperate forests, temperate and tropical grasslands where pastoral nomadism and large scale mechanized farming takes place and the equatorial regions.
- These include the steppes (Russia) and prairies (of Canada).

PUSH FACTORS IN THESE AREAS

a. Poor communications since roads are difficult to construct due to thick forests.
b. Occurrence of diseases and pests that attack people, crops and animals.
c. It is difficult to construct houses.
d. Soils are mostly water-logged, this does not support farming.

C. DENSELY POPULATED AREAS

- These are areas whose populations are very high.

SOME DENSELY POPULATED AREAS IN THE WORLD

1. INDUSTRIAL NORTH WEST EUROPE

This includes the following:

i. Great Britain
ii. France
iii. Western Germany
iv. Benelux
v. Denmark
vi. Belgium

PULL FACTORS IN THESE AREAS

- It is centre for civilization.
- It has evergreen coniferous forests which are of commercial value.
- Good climate for human settlement due to warm summers and mild winters.
- Improved agriculture due to scientific management.
- Fertile soils that promote farming.
- Improving living conditions.
- Good sea transport because of the long indented coastline.
- Development of industries due to abundant raw materials such as iron ores, coal, etc.
- Presence of employment in industries.

2. NORTH EAST USA (AMERICA)

- This includes the industrial areas of the United States and Canada

This includes the following:

i. South of the Great Lakes region from Chicago, Detroit, etc.
ii. New York
iii. Washington
iv. Boston
v. Philadelphia
vi. Pittsburgh
vii. Toronto
viii. Montreal
ix. Quebec
x. Atlantic sea board

PULL FACTORS IN THESE AREAS

☞ The growth of industries that create employment.

- ☞ Fertile soils that promote farming.
- ☞ Abundant raw materials promote trade.
- ☞ Improved living conditions.
- ☞ Access to cheap water transport.

3. THE NILE VALLEY AND DELTA OF EGYPT

PULL FACTORS IN THESE AREAS

- ☞ Flat land for irrigation farming and settlement.
- ☞ It has fertile soils along river banks for farming.

4. MONSOON ASIA

- **This region covers the following areas:**

i. China
ii. India
iii. Bangladesh
iv. Sri Lanka
v. Indonesia (Java in particular)
vi. Irrawaddy delta in Burma
vii. The Chao-phraya Basin of Thailand
viii. Red and Mekong Deltas of North and South Veitnam

PULL FACTORS IN THESE AREAS

- ☞ It is a centre for trade.
- ☞ Fertile soils for agriculture.
- ☞ Access to cheap water transport.
- ☞ Heavy industrial development.

5. WITWATERS RAND IN SOUTH AFRICA

PULL FACTORS IN THIS REGION

- ☞ It is a centre for trade.
- ☞ Availability of employment in industries.
- ☞ Expanding mining works.

6. WEST AFRICAN COASTAL REGIONS

PULL FACTORS IN THESE AREAS

- ☞ Fertile soils for farming.
- ☞ Access to water and air transport.

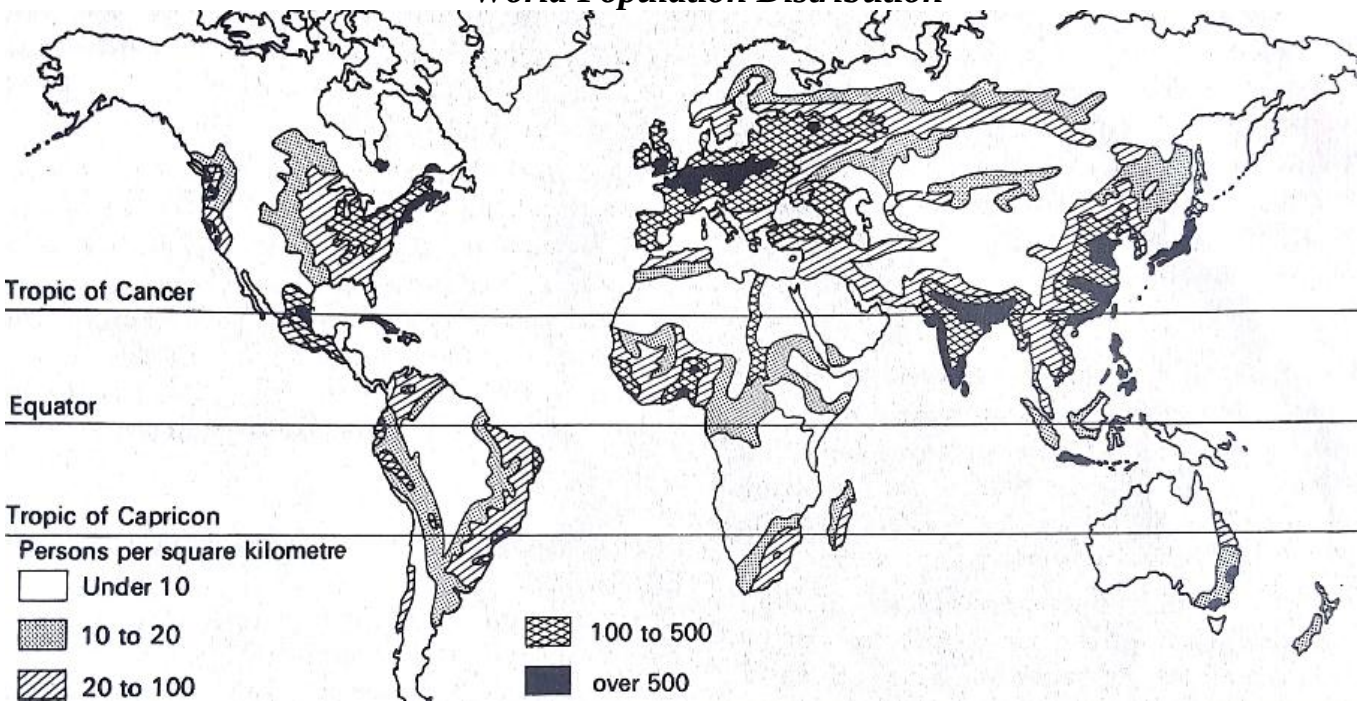
7. JAPAN

PULL FACTORS

- ☞ Cheap water transport.
- ☞ Presence of employment in industries.
- ☞ It is a centre for trade.
- ☞ Improved living conditions.
- ☞ Abundant raw materials.

NOTE: *Asia has 60% of the world's population with 3.8 billion people, China and India together contribute 40%, Africa has 12%, Europe has 11%, North America 8%, South America 5.3% and Australia 0.3% of the world's population.*

World Population Distribution



ADVANTAGES OF HIGH POPULATION DENSITY

- There is abundant workforce.
- There will be increased competition, this promotes development.
- It increases the market base for the products produced.
- It promotes cultural diversity. This promotes the tourism industry.

DISADVANTAGES OF HIGH POPULATION DENSITY

- Wealth becomes unevenly distributed.
- Increased food insecurity resulting from decreased output due to pressure on land.
- Increased environmental damage.
- Increased pressure on social services.
- High crime rates.
- High unemployment rates.
- High chances of outbreaks of epidemics and other disasters.

POPULATION DISTRIBUTION IN MALAWI

- The following is the map of Malawi showing the population distribution in Malawi.
- Study it carefully by paying attention to the areas that are densely and sparsely populated in all the three regions (northern, central and southern) of the country.

1. KARONGA (HIGH)

Pull Factors

☞Good soils
☞Fishing
☞Water availability
☞Good food supply

2. RUMPHI (LOW)

Push Factors

☞Poor soils
☞It is hilly
☞Poor transport
☞Restricted area (Vwaza and Nyika)

3. NKHATABAY (HIGH)

Pull Factors

☞Good water supply
☞Fishing
☞Good soils for farming
☞Good water and road transport

4. KASUNGU (LOW)

Push Factor

☞Restricted area

5. LILONGWE (HIGH)

Pull Factors

☞Good transport

6. MANGOCHI (HIGH)

Pull Factors

☞Fertile soils for farming
☞Employment in industries
☞Resort centre
☞Fishing
☞Flat terrain
☞Good water supply

7. NTCHEU (HIGH)

Pull Factors

☞Good transport
☞Fertile soils

8. BLANTYRE (HIGH)

☞Employment in industries
☞Fertile soils for farming
☞It is the capital city

Pull Factors

☞Good transport
☞Pleasant climate
☞Abundant power supply
☞Availability of water
☞Employment in industries
☞It is a centre for trade

9. MULANJE (HIGH)

Pull Factors

☞Fertile soils for farming
☞Employment in industries
☞Good transport
☞Pleasant climate

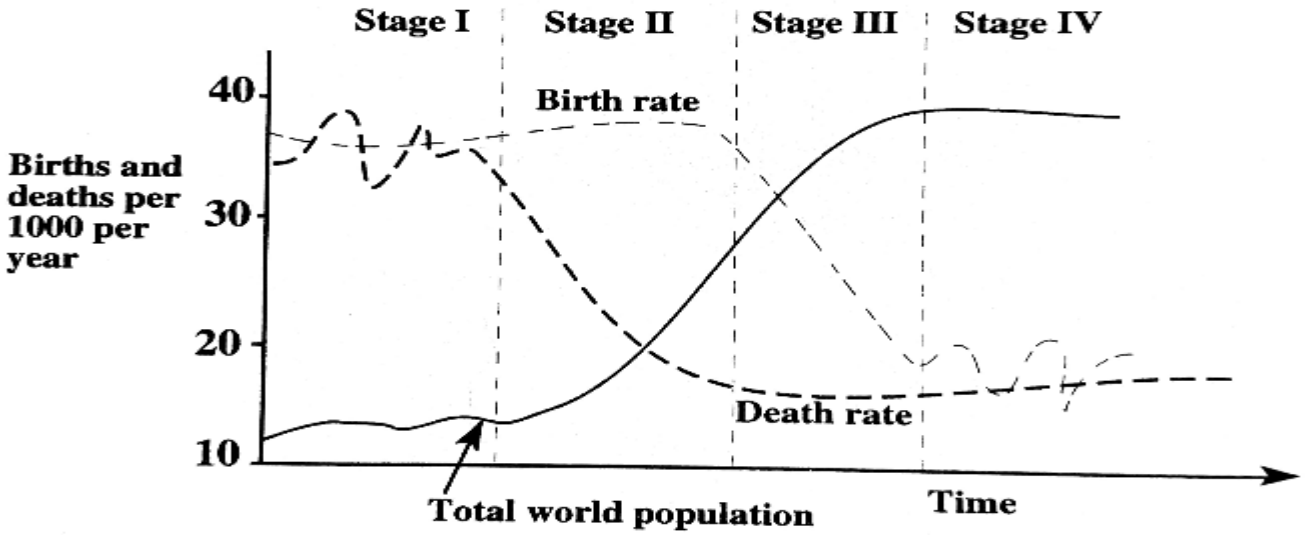
THE DEMOGRAPHIC TRANSITION MODEL

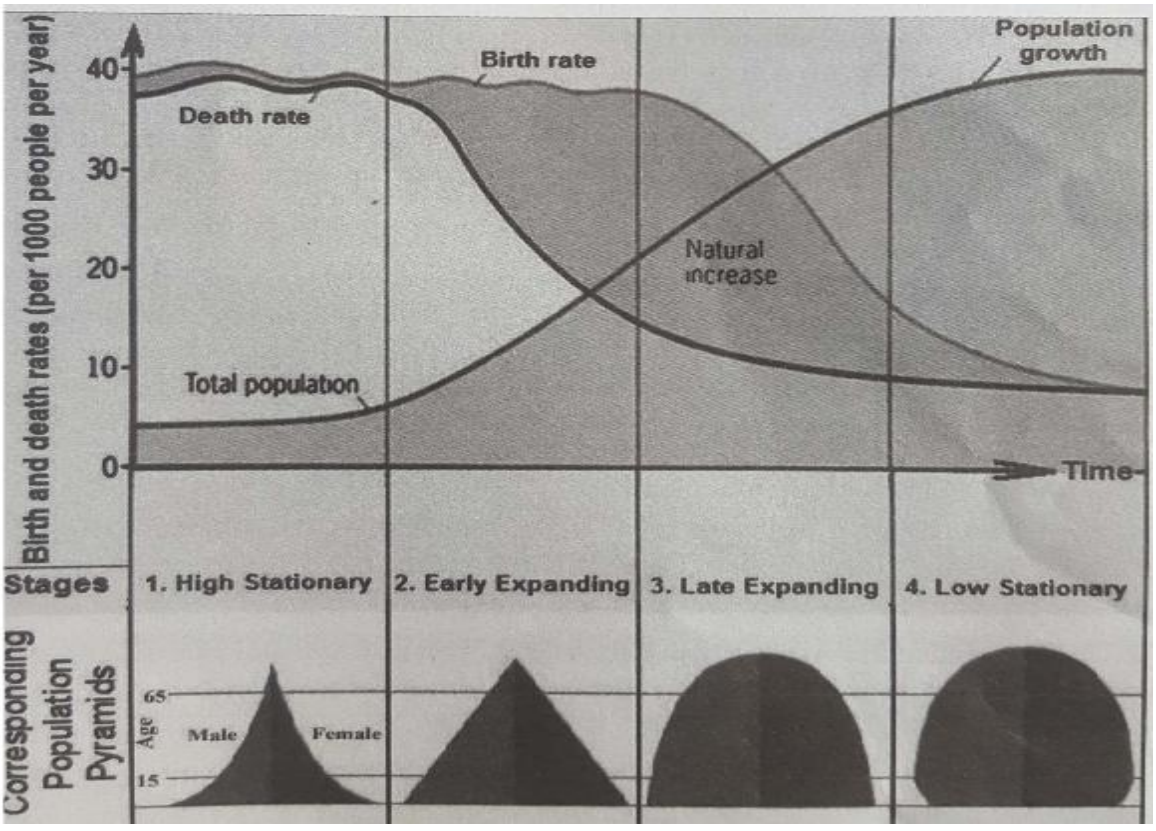
✍ It is a model that describes the transformation of a country's population from having high birth rates to low birth rates as the country becomes more industrialised.

- It links population changes to levels of economic, education and healthcare developments.
- The term **"Demographic Transition"** was coined (proposed) by Frank W. Notestein in 1929. Later in 1945, Warren S. Thompson produced a theory based on the population changes in the western countries.

- The population trends have changed over time. Almost all nations were at a certain time characterized by very high fertility rates, but with the passage of time the birth rates have been seen falling.
  The graph below shows the demographic transition.

The Demographic Transition Graph (Population Development)





INTERPRETATION OF THE DEMOGRAPHIC TRANSITION GRAPH

IN STAGE I: (HIGH STATIONARY)

- Both birth rate and death rates are high. ***This makes the population growth to be slow.***
- ✓ It is the most primitive of all the stages

REASONS FOR HIGH BIRTH AND DEATH RATE IN STAGE I

- ✓ Poor hygiene.
- ✓ Poor medical services.
- ✓ Lack of access to family planning services.
- ✓ Low education levels of women.
- ✓ Low employment among women.
- ✓ Poor diets.

NOTE: Stage I is associated with **primitive** or **agrarian societies** and **economies**.

IN STAGE II: (EARLY EXPANSION)

- ☞ The death rate has fallen while the birth rate remains high. ***This makes the population to grow rapidly.***

REASONS FOR A DECREASE IN DEATH RATE IN STAGE II

- ✓ Improved hygiene.
- ✓ Improved medical services.
- ✓ Improved education levels of women.
- ✓ Improved diets.

COUNTRIES THAT ARE IN STAGE II

- *Most of the countries in this stage are in developing nations. Some of them are:*

1) Malawi
2) Mozambique
3) Zambia
4) Zimbabwe
5) Namibia
6) Tanzania
7) Yemen
8) Afghanistan
9) Palestinian territories

NOTE: Stage II is associated with **developing countries (societies)** with **developing economies**.

IN STAGE III: (LATE EXPANSION)

- ☞ The death rate continues to fall and the birth rate falls too. ***This makes the population growth to start declining (decreasing).***

COUNTRIES THAT ARE IN STAGE III

- ☞ South Africa
- ☞ Malaysia
- ☞ Egypt
- ☞ Ghana
- ☞ Senegal
- ☞ Kenya
- ☞ Botswana
- ☞ Tunisia
- ☞ Mexico
- ☞ Turkey

IN STAGE IV: (LOW STATIONARY)

☞ Both birth rates and the death rates are low and almost the same. ***This makes the population growth to almost stop growing (level-off).***

NOTE: Stage IV is associated with **developed countries** with **developed economies.**

COUNTRIES THAT ARE IN STAGE IV

1) Britain
2) Japan
3) Spain
4) Argentina
5) Sweden
6) Singapore
7) Mauritius
8) Canada

REASONS FOR LOW DEATH RATES AND LOW BIRTH RATES IN STAGE IV

- Improvements in hygiene.
- Improvements in sanitation.
- Improvements in medication.
- Improvements in diets.
- Increased access to family planning services.
- High educational levels for women.

❖ It has to be noted that all countries will pass through all the stages of transition as they develop. However, it may take a very long time for poor, developing countries to complete these stages.

POPULATION DYNAMICS

- This is the study of the factors that affect growth, stability and the decline of populations.

✍ Populations normally go through the following stages: **growth**, **stability** and **decline**.

POPULATION STRUCTURE

☞ This means the composition of a given population in terms of age, sex and number.

☞ The population structure is shown by a **population pyramid** or **population profile**, which is also called an **age-sex pyramid**.

☞ It has to be noted that a population pyramid for a developing nation such as Malawi is broad-based (it has a lot of young people), while that of a developed nation like that of Britain is narrow-based.

WHAT A POPULATION PYRAMID SHOWS

✍ Percentage of males and females in each age group.
✍ Age-sex composition divided into five-year age groups.
✍ Changes in the birth rates and death rates.
✍ Population of the youths and elderly people who depend on the economically active people.

IMPORTANCE OF POPULATION PYRAMIDS

- ✓ It helps in comparing countries.
- ✓ It helps shed light on the extent of a country's social and economic developments.
- ✓ It helps to determine the future jobs, schools, hospitals and housing.
- ✓ It helps the governments in policy making by knowing the needs of the populations.

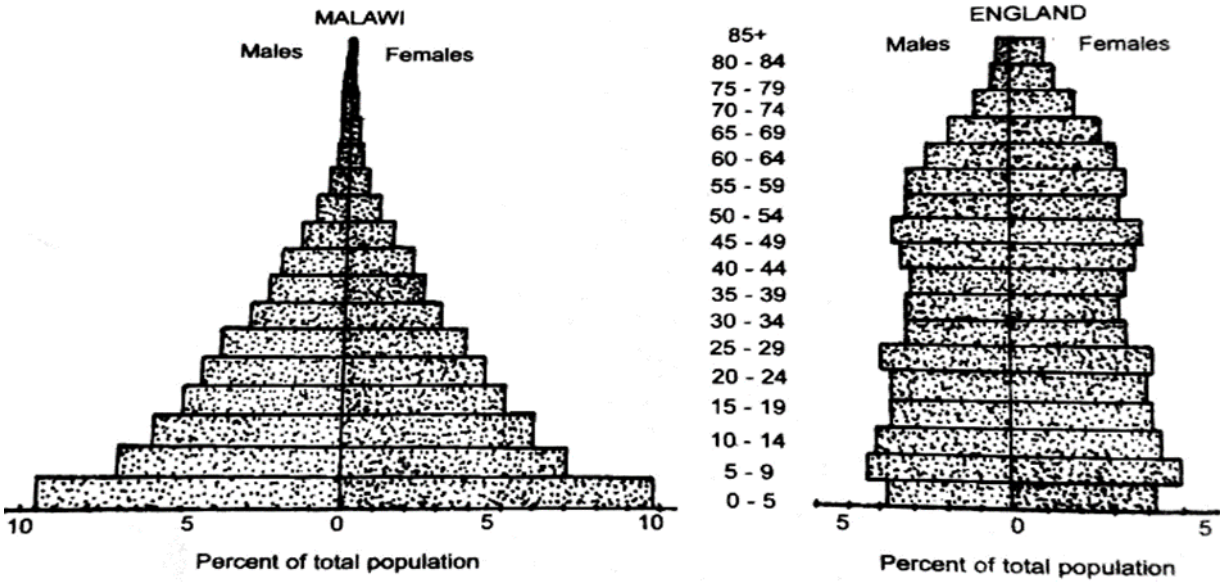
- ✓ It helps investors to target their markets in a better way to increase the chances of success in their business.
- ✓ It helps predict population trends by enabling people observe natural increase.

FACTORS THAT AFFECT THE POPULATION PYRAMID

a. Death rate
b. Birth rate
c. Life expectancy

Comparison of age-sex pyramids for developing nations (such as Malawi) and developed nations (such as Japan)

Youthful population structure (Malawi) **Ageing population structure (England)**



WHAT THE PYRAMID FOR DEVELOPING COUNTRIES SHOWS

- A high proportion of children and low proportion of older people.
- This means that babies are being born at a faster rate than the rate at which people die.

REASONS FOR (CAUSES OF) A YOUTHFUL POPULATION STRUCTURE IN DEVELOPING NATIONS SUCH AS MALAWI

a) High mortality rates due to lack of access to adequate health care systems.
b) High birthrates due to low education levels for women and lack of access to contraceptives.
c) Dependence on farming makes couples have many children to help in farming.
d) Short life expectancy resulting from malnutrition, unemployment and HIV/AIDS.

REASONS FOR HAVING MANY CHILDREN IN DEVELOPING COUNTRIES

1) Lack of family planning services.
2) Low education levels for women.
3) Children are taken as a source of labour.
4) Most young girls and women do not continue with their education hence, lack of jobs force them into early marriages.
5) Couples hope that having more children would help them in old age.

6) Low employment opportunities for women.

☞ This makes them focus on child-bearing activities.

7) High death rates due to lack of health care and hygiene.

☞ Families bear more children since they assume that when others die, some will survive.

EXAMPLES OF DEVELOPING COUNTRIES (THOSE WITH A YOUTHFUL POPULATION STRUCTURE)

1) Malawi
2) Mozambique
3) Zambia
4) Brazil
5) Kenya
6) Rwanda
7) Swaziland

NOTE:

☞These countries are characterized by developing economies.
☞They have high fertility rates

WHAT THE PYRAMID FOR DEVELOPED COUNTRIES SHOWS

✍Low birth rates due to high education and employments levels and high access to contraceptives for women.
✍Low death rates due to improved health care and medication.
✍Long life expectancy due to improved living standards.
✍More old women than men because men are involved in more risky behaviours than women are.

EXAMPLES OF DEVELOPED COUNTRIES (THOSE WITH AN AGEING POPULATION STRUCTURE)

1) Japan
2) Great Britain
3) Sweden
4) United States of America (USA)
5) Norway

REASONS FOR AN AGEING POPULATION STRUCTURE IN DEVELOPED NATIONS SUCH AS SWEDEN

1) Long life expectancy.
☞This is due to improved medical care and hygiene.
2) Access to old age security systems.
3) Low death rates.
4) Absence of child labour makes families bear fewer children.
5) Women have an access to many employment opportunities.
☞This makes them not to be submissive to their husbands.
6) Low fertility (birth) rates due to availability of family planning services.
7) High education levels for women.

ADVANTAGE OF A YOUTHFUL POPULATION STRUCTURE ON DEVELOPMENT

☞Presence of abundant labour in the work sector.

NEGATIVE IMPLICATIONS (EFFECTS) OF A YOUTHFUL POPULATION STRUCTURE

i) High levels of poverty.
☞ This results in high incidences of morbidity (illnesses) and mortality (deaths).
☞ These negatively affect development since sick people cannot take part in development, guardians spend a lot of time caring for the sick, and a lot of resources are spend to bury the dead.
ii) High levels of employment.

iii) Low standards of living.
iv) Increased rates of crime that may scare away investors.
v) Poor social service delivery.
☞ This happens as more resources are wasted on providing social services to the increasing population instead of being used on development.
vi) Environmental degradation.
☞ This results from deforestation as people clear forests for farming, settlement. There is also a lot of poaching, overfishing, water, air and land pollution.

ADVANTAGES OF AN AGEING POPULATION STRUCTURE

a) Increased investment and business activities.
✓ High levels of income in developed nations mean more businesses. It means more people can be employed, and improve their standards of living.
b) Sustainability of the world's vast resources in the environment.
✓ Low fertility rates imply that a lot of resources in the environment are conserved and they can be used sustainably in development.
✓ Sustainable use of resources means making use of the available resources, taking into consideration the needs of future generations.
c) Reduced expenditure in terms of education and health care for young people. These served resources can be used for other developmental projects.

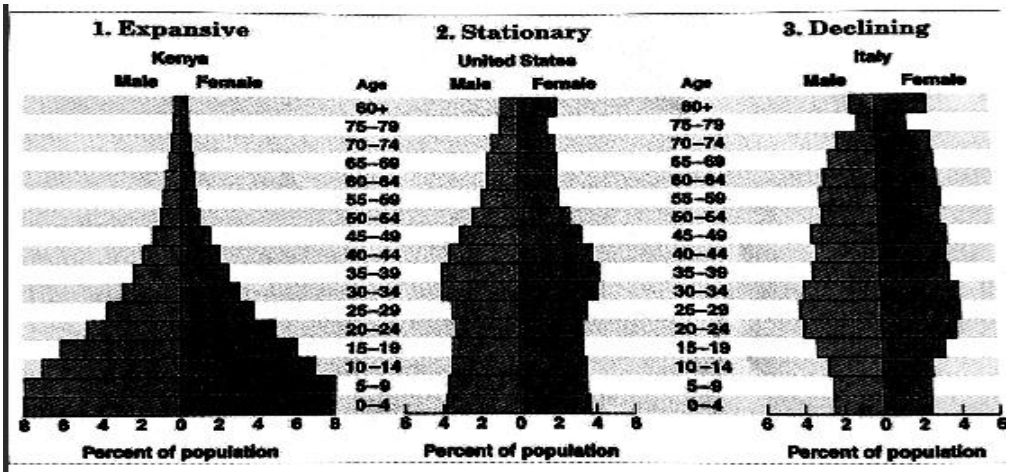
NEGATIVE IMPLICATIONS (DISADVANTAGES) OF AN AGEING POPULATION STRUCTURE

1) Large unproductive dependent population.
✓ This is the case since there are more old people.
2) Small work force.
✓ This happens since many young people spend much of their time on education and training. This means that labour has to be imported from other countries.
3) Migrants move into the country to work in low paid jobs. This could increase crime rates.

TYPES OF PYRAMID SHAPES

a) Expansive (expanding or triangular) pyramid
b) Stationary pyramid
c) Declining pyramid

Types of Pyramid Shapes



EXPANSIVE (EXPANDING OR TRIANGULAR) PYRAMID

- ☞ Broad bases, but quickly taper off towards the older age groups and narrow at the top.
- ☞ More babies are born than the number of people ageing.
- ☞ The majority of people in the country are below the age of 30, an example is Malawi.

STATIONARY PYRAMID

- ☞ Narrow base and roughly equal numbers in each age group, tapering off in the older ages.
- ☞ The base and the centre of the pyramid make a box shape.
- ☞ In this case, the number of babies born is almost the same as the number of people ageing.
- ☞ An example is the United States.

DECLINING PYRAMID

- ☞ This pyramid has a small base, stay quite wide until the top, pointing downwards.
- ☞ Les babies are born than the people ageing. An example is Italy.

DEVELOPMENT AND POPULATION GROWTH

☞Development refers to the sustained elevation of an entire society and social systems towards a more humane life.

AIMS OF DEVELOPMENT

- ➢ To raise levels of living by providing higher incomes, more jobs, better education and more attention to cultural values.
- ➢ To expand the range of economic and social choices to individuals by freeing them from dependence on other people and forces of ignorance and human misery.
- ➢ To increase the distribution of basic life-sustaining goods such as food, shelter, health and security of people.

❖ In order to achieve the above aims, the population has to be kept to manageable levels.

CAUSES OF RAPID POPULATION GROWTH IN DEVELOPING COUNTRIES

i. High birth rates.
ii. Immigration.
iii. Sex preferences
iv. Ineffective population control
v. Cultural practices such as wife inheritance, widow cleansing and polygamy.
vi. Low mortality (death) rates due to improved medical care and sanitation.

STRATEGIES (MEASURES) USED TO CONTROL POPULATION GROWTH IN DIFFERENT PARTS OF THE WORLD

<u>WORLD POPULATION POLICIES</u>

POPULATION POLICY

⍁ It is a course of action designed to limit population growth in a country.

A) MALAWI

☞Provision of free and affordable family planning services.
☞Encouraging late marriages through print and electronic media.
☞Promotion of the girl-child education.
☞Women empowerment through involvement in decision-making.

☞Fighting child labour through civic education and free primary education.
☞Reducing infant mortality.

THE OVERALL GOAL OF THE MALAWI POPULATION POLICY

✍To improve the living standards and the quality of life of the people of Malawi.

B) NIGERIA

- ❖ Family planning.
- ❖ Promotion of women education.
- ❖ Four-child per couple policy.
- ❖ Late marriages.
- ❖ Reducing infant mortality.

C) EGYPT

- ➢ Promotion of family planning.
- ➢ Discouraging big families by providing incentives to small families. For example, through direct money payments.

D) THE UNITED KINGDOM (UK)

- Protection of young girls from early marriages below the age of 18.
- Family planning services.
- Provision of old age social security schemes that force couples to fewer children.
- Promotion of women education.

E) SWEDEN

- ✓ Family planning services.
- ✓ Encouraging small families.
- ✓ Old age social security services.

F) CHINA

- ☞ Discouraging early marriages.
- ☞ Abortion is done especially in rural areas.
- ☞ Family planning services.
- ☞ Enactment and enforcement of laws that allow families to have 2 to 3 children.

G) INDIA

- ▪ Forcing people to possess sterilization certificates.
- ▪ Provision of gifts and money to those who possess sterilization certificates.
- ▪ Family planning services.
- ▪ Promoting women economic empowerment.

H) ISRAEL

- ❖ Previously, the country had a problem of labour shortages.
- ❖ Promotes a lot of children to be born.

ANOTHER SOLUTION

- ➢ The country is asking Jews to return to Israel through a process called Aliyah.

MAIN CHALLENGES TO CONTRACEPTIVE (FAMILY PLANNING) UPTAKE

① Religious beliefs that discourage the use of contraceptives.
② Cultural beliefs that promote large families.
③ The perception that most contraceptive methods are associated with side effects.

NEGATIVE EFFECTS OF RAPID POPULATION GROWTH

a) High levels of poverty.

☞ This results in high incidences of morbidity (illnesses) and mortality (deaths).

☞ These negatively affect development since sick people cannot take part in development, guardians spend time caring for the sick, and a lot of resources are spend to bury the dead.

b) High levels of unemployment.

c) High crime rates.

d) Low standards of living.

e) Increased rates of crime that may scare away investors.

f) Poor social service delivery.

☞ This happens as more resources are wasted on providing social services to the increasing population instead of being used on development.

g) Environmental degradation.

☞ This results from deforestation as people clear forests for farming, settlement. There is also a lot of poaching, overfishing, water, air and land pollution.

BENEFITS OF CONTROLLING POPULATION GROWTH

- It improves access to health services and education.
- It increases chances of reducing poverty.
- It reduces energy and food consumption. This reduces emission of greenhouse gases into the atmosphere responsible for global warming.
- Environmental conservation by reducing demand and pressure on natural resources.
- The government cuts expenditure for supporting the citizens of the countries. These savings can be used for other developmental projects.

CALCULATIONS

1. POPULATION DENSITY $= \frac{\textbf{Total Population}}{\textbf{Total Area}}$

EXAMPLE

- An area has a population of 5000 people. If it is $25km^2$ big, calculate the population density.

SOLUTION

$$\textbf{POPULATION DENSITY} = \frac{\textbf{Total Population}}{\textbf{Total Area}}$$

$$= \frac{\textbf{5000 People}}{\textbf{25km}^2}$$

$$= \underline{\textbf{200 People per km}^2}$$

2. TOTAL POPULATION=Population Density×Total Area

EXAMPLE

- Given that the population density of country **P** is 200 persons per km^2, and that it has a total area of $25km^2$, calculate its total population.

SOLUTION

TOTAL POPULATION=Population Density×Total Area

=200 Persons/~~km²~~×25~~km²~~

=5000 Persons

3. **AREA=$\frac{\text{Total Population}}{\text{Population Density}}$**

EXAMPLE

✍ Given that country Q has a total population of 5000 people, and a population density of 200 persons per square kilometre (km^2), calculate its total area.

SOLUTION

AREA=$\frac{\text{Total Population}}{\text{Population Density}}$

=$\frac{5000\ \sout{\text{People}}}{200\ \sout{\text{people}}/km^2}$

=25km²

4. **CRUDE BIRTH RATE= $\frac{(\text{Number of Births in a year})}{\text{Total Population}} \times 1000$**

Example: In 2017 a country had a total population of 10 million people, and it also registered 130 000 births. Calculate its crude birth rate.

SOLUTION

CRUDE BIRTH RATE= $\frac{(\text{Number of Births in a year})}{\text{Total Population}} \times 1000$

=$\frac{130\ 000}{10\ 000\ 000} \times 1000$

=13

✍This means that in this country, for every 1000 people, 13 live children were added to the population.

5. **CRUDE DEATH RATE= $\frac{(\text{Number of Deaths in a year})}{\text{Total Population}} \times 1000$**

Example: In 2017 a country had a total population of 10 million people, and it also registered 50 000 deaths. Calculate its crude death rate.

SOLUTION

CRUDE DEATH RATE= $\frac{(\text{Number of Deaths in a year})}{\text{Total Population}} \times 1000$

=$\frac{50\ 000}{10\ 000\ 000} \times 1000$

=5

✍This means that in this country, for every 1000 people, 5 people died in the population.

6. **NATURAL INCREASE=Birthrate-Deathrate**

Example: In the above example, where a country had a total population of 10 000 000, and registered 130 000 births and 50 000 deaths, you first need to calculate the Crude Birth Rate and Crude Death Rate. The CBD was 13 and the CDR was 5.

✓ Therefore, Natrural Increase will be:13-5

=8

7. INFANT MORTALITY RATE $= \frac{\text{Number of Infant Deaths}}{\text{Number of Live Births}} \times 1000$

Example: In 2017, a certain country had recorded 1200 infant deaths, and 150 000 live births. Calculate the infant mortality rate for the country.

SOLUTION

$$\text{INFANT MORTALITY RATE} = \frac{\text{Number of Infant Deaths}}{\text{Number of Live Births}} \times 1000$$
$$= \frac{1200}{150\,000} \times 1000$$
$$= 8$$

✍ This means that per 1000 live births, 8 infants died.

8. MATERNAL MORTALITY RATE $= \frac{\text{Number of Maternal Deaths}}{\text{Number of Live Births}} \times 100\,000$

Example: In 2017, a country registered 80 maternal deaths and 160 000 live births. Calculate the maternal mortality rate.

SOLUTION

$$\text{MATERNAL MORTALITY RATE} = \frac{\text{Number of Maternal Deaths}}{\text{Number of Live Births}} \times 100\,000$$
$$= \frac{80}{160\,000} \times 100\,000$$
$$= 50$$

✍ This means that there were 50 maternal deaths for every 100 000 live births.

9. DEPENDENCY RATIO $= \frac{\text{Number of children (aged 0–14)+Numberof elderly people (aged 65 and over)}}{\text{Number of working age group (15–64 years)}} \times 100$

TOPIC 3: SETTLEMENTS

- Settlement refers to a place where people live and have built homes, their activities and transport linkages that function as an entity.

MAIN ELEMENTS IN THE DEFINITION OF SETTLEMENT

☞ People
☞ What people do
☞ Buildings and their functions
☞ Transport linkages

DEFINITION OF TERMS

a) SETTLEMENT

☞ It is a place where people live and have built homes.

b) HAMLET

☞ It is where there are two or three houses without shops, schools or services.

c) CONURBATION

☞ It is a situation where several towns are joined together.

d) MEGALOPOLIS

☞ This is where many cities are joined together.

e) METROPOLIS

☞ This is the main city of a region on which the surrounding towns depend.
☞ These dependent towns are called ***satellite settlements,*** which together with the mother city are called ***metropolitan system*** or ***decentralized city***.

f) SITE

☞ It is the actual piece of land on which a settlement is built.

g) SITUATION

☞ It is the relationship of a settlement with its immediate environment such as rivers, mountains and other settlements.

h) PATTERN

☞ It is the situation of buildings with respect to each other.

i) SHAPE

☞ It refers to the appearance of the individual settlements.
☞ It is also called the ***internal structure of a settlement***.

TYPES OF SETTLEMENTS

❶ **Rural settlements**
❷ **Urban settlements**

RURAL SETTLEMENTS

☞These are unifunctional and are concerned with primary activities such as agriculture for their existence.

CHARACTERISTICS OF RURAL SETTLEMENTS

✓ The main economic activity is farming.
✓ Traditional attitudes are very strong.
✓ Small and sparse populations.
✓ The value of land is very low.
✓ Most people are related by blood.
✓ Most of the land is customary owned (it is communal).
✓ Most buildings are semi-permanent.
✓ People do not easily accept change.
✓ The society is mostly homogeneous (one tribe dominates).
✓ Presence of poor social services such as schools and hospitals.

URBAN SETTLEMENTS

☞ These are multifunctional, and are concerned with secondary activities such as manufacturing and tertiary activities such as transport and trade; and administration such as towns and cities.

CHARACTERISTICS OF URBAN SETTLEMENTS

✍ The value of land is very high due to its high demand.
✍ Most buildings are permanent.
✍ It is dominated by secondary and tertiary activities.
✍ The population density is very high.
✍ Presence of modern social services such as schools and hospitals.
✍ The society is heterogeneous (has many tribes and/or races).

SETTLEMENT PATTERNS

① Linear settlement pattern

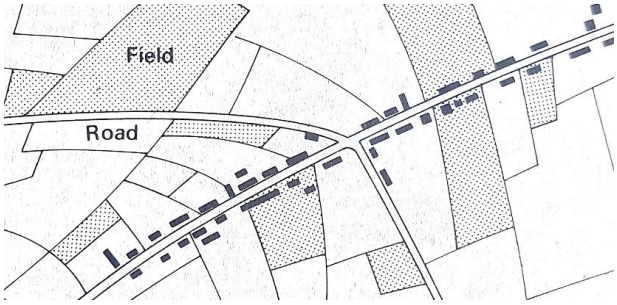
② Nucleated (compacted) settlement pattern

③ Dispersed (scattered) settlement pattern

LINEAR (RIBBON OR PLANAR) SETTLEMENT PATTERN

➢ The buildings follow a line of movement such as a track, road, river or railway line.

Linear Settlement Pattern



FACTORS THAT INFLUENCE LINEAR SETTLEMENT PATTERN

- ☞ The need for the people to do business.
- ☞ The need to do farming activities along these lines.
- ☞ The need to have easy movement.

ADVANTAGES OF LINEAR SETTLEMENT PATTERN

i. Easy access to social services (amenities).
ii. Easy to do trade or do business activities.
iii. Quick spread of innovations and ideas.
iv. There is easy transport and communication.
v. It creates enough land for other beneficial purposes.

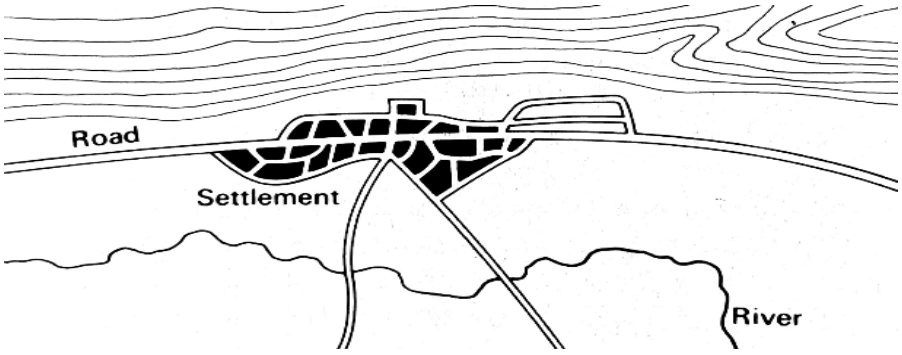
DISADVANTAGES OF LINEAR SETTLEMENT PATTERN

a) Noise pollution from moving cars or trains.
b) Increased risk of being run over by speeding cars or trains.
c) Increased risk of being carried away by flooding water along the river banks.

NUCLEATED (COMPACTED) SETTLEMENT PATTERN

- ❖ The buildings take the shape of the square or circle where houses are close to each other.
- ❖ The houses are normally connected by roads.

Nucleated Settlement Pattern



FACTORS THAT INCLUENCE NUCLEATED SETTLEMENT PATTERN

- ☞ Availability of flat land.
- ☞ The need to group together for defence and protection purposes.

- ☞ Presence of social services such as water, schools and electricity.
- ☞ Presence of fertile soils.
- ☞ Concentration of scarce resources at a particular place, such as springs.
- ☞ Trade or commercial activities on the road junctions.
- ☞ Fishing, especially along shores of Lake Malawi.

ADVANTAGES OF NUCLEATED SETTLEMENT PATTERN

a) It ensures security to the residents.
b) There is abundant workforce to utilize the resources.
c) There is great cultural diversity. This promotes the tourism industry.
d) It promotes social interaction and unity among the people.
e) It creates enough land which is left for other beneficial use.
f) It is easy for the government to provide social services to the people.

DISADVANTAGES OF NUCLEATED SETTLEMENT PATTERN

- ☞ Diseases easily spread.
- ☞ There is no privacy.
- ☞ Increased social problems such as theft and prostitution.
- ☞ High competition for resources which induces stress in people.
- ☞ It promotes conflicts that result from different opinions and ideas.
- ☞ Pollution of the environment (water, air and land pollution).

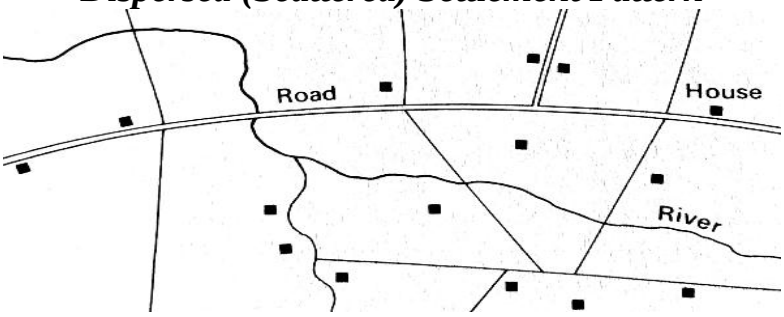
DISPERSED (SCATTERED) SETTLEMENT PATTERN

- ➢ This is where houses are away from each other and are found away from the nearest villages.

FACTORS THAT INFLUENCE DISPERSED (SCATTERED) SETTLEMENT PATTERN

- Presence of hilly or mountainous regions which often have infertile soils and do not allow construction of houses and farm mechanization.
- Limited and insufficient natural resources such as water and fertile soils.
- Availability of water everywhere. For instance, the availability of marshes.
- Presence of forest reserves, game reserves and national parks.
- Land ownership. Private land ownership disperses people.

Dispersed (Scattered) Settlement Pattern



ADVANTAGES OF DISPERSED (SCATTERED) SETTLEMENT PATTERN

- Good hygiene.
- Protection of environmental resources.
- Increased privacy and freedom.

- Diseases do not easily spread.
- There is no noise pollution.
- There is maximum use of land.
- Ability to use machinery where topography allows.

DISADVANTAGES OF DISPERSED SETTLEMENT PATTERN

- There is no security.
- There are not enough people to work.
- People travel for long distances to access social services.
- It is difficult to provide social services to the people.
- Lack of social interaction and unity.

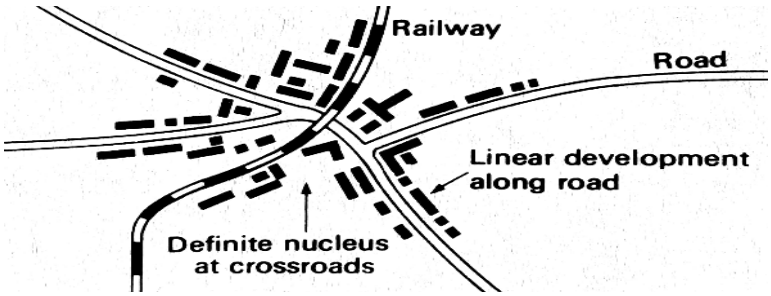
SOLUTIONS TO THE DISADVANTAGES (PROBLEMS) OF DISPERSED SETTLEMENT PATTERN

- Listening to the radio.
- Watching television.
- Use of cell phones.

CROSS SETTLEMENT PATTERN

- This is formed when two linear settlement patterns cross each other.
- The **advantage** of this is that there are a lot of ***commercial activities*** taking place.

Cross Settlement Pattern



FACTORS THAT INFLUENCE SETTLEMENTS

- Water supply
- Fertile land
- Flat land
- Transport links
- Good climate
- Availability of resources such as firewood, fuel, etc.
- Defensive position (for example, being surrounded by mountains)

FUNCTIONS OF SETTLEMENTS

- The functions of settlements relate to its economic and social development.
- The functions of settlements are its activities and the existence of such settlements is justified by such developmental activities.

FUNCTIONS OF SETTLEMENTS (OR CLASSIFICATION OF TOWNS ACCORDING TO THEIR FUNCTIONS)

1. MARKET (CENTRES FOR BUSINESS)

- These are centres of exchange, which collect and distribute local products.

☞ For example, Blantyre in Malawi.

2. INDUSTRIAL AREAS

☞ These process raw materials produced by the primary industries into finished products.

☞ These towns are located near power and water supplies, raw materials and markets.

3. COMMERCE

☞ These are centres of commerce and finance, which deal with trade, having banking and insurance facilities.

☞ For example, Blantyre.

4. MINING

☞ These are located in unusual places provided it has sufficient mineral resources.

5. ADMINISTRATION

☞ These deal with administration and organization of the nation or the divisions within the country.

☞ For example, Lilongwe.

6. CULTURAL AREAS

☞ These are cultural centres.

7. EDUCATION

☞ These habour renowned universities and colleges.

☞ For example, Zomba in Malawi.

8. ECCLESIASTICAL AREAS

☞ These are historical and religious towns that are mostly visited by pilgrims from different parts of the world.

☞ For example, Israel and Mecca.

9. ROYAL PLACES

☞ These are traditional residences of monarchs, kings and queens, sultans and their consorts.

☞ They have beautiful palaces and often visited by foreign dignitaries.

10.HOLIDAY, HILL AND HEALTH RESORTS

☞ These are located in favourable geographical surroundings such as coastal resorts for activities such as bathing.

11.PORTS

☞ These places have deep waters, warehouses, customs offices, banking and insurance services where steamers and ships sleep.

☞ Examples include sea ports, packet-stations, out-ports, river ports, fishing ports, residential or satellite towns.

☞ In Malawi examples would include Nkhatabay and Karonga (Chilumba).

12.RECREATION

☞ The main activity for these is leisure and accommodation, they promote tourism.

URBANIZATION

✍ It is an increase in the proportion of people living in urban areas compared to rural areas.

☞ It occurs when the urban population grows more rapidly than rural population.

URBAN GROWTH

➢ It is an increase in the number of people living in urban areas (urban dwellers).

☞ It can occur without urbanization taking place.

URBAN EXPANSION

- ➢ It is the physical growth as urban population increases.
- ☞ It is also called ***physical urbanization***.

URBAN SPRAWL

- ☞ It is the unplanned expansion of rapidly growing cities over a large space.

JUVENILE DELINQUENCY

☞This is when street families find their way into city streets either for begging or as thieves.

FACTORS RESPONSIBLE FOR URBANIZATION

a) RURAL-URBAN MIGRATION

- ☞ This is the movement of people from rural areas to urban areas.

b) NATURAL INCREASE (HIGH BIRTH RATES)

☞ When the birth rate is higher in urban areas than death rate.

REASONS WHY PEOPLE MIGRATE TO URBAN AREAS

1) CULTURAL FACTORS

- ✍ These result from the need to break away from traditional constraints (problems) of the social set-up.
- ✍ For example, running away from witchcraft in the villages.

2) ECONOMIC FACTORS

- ✍ This is where people migrate to urban areas in order to find employment or do businesses.

3) SOCIAL FACTORS

- ✍ This is where people in the rural areas are attracted to city life due to good social services such as electricity, good education, hospitals and entertainment.

4) DEMOGRAPHIC FACTORS

- ✍ This is when the population growth rate is very high in rural areas, such that life becomes very hard in terms of finding income, or having enough land for farming.
- ✍ As a result, people opt to try their luck in urban areas.

5) PHYSICAL FACTORS

- ✍ This is when climatic disasters such as droughts, floods or hail storms force people to abandon their homes and move to urban areas.

EFFECTS OF URBANIZATION

1) POSITIVE EFFECTS OF URBANIZATIUON

- ✓ Spread of new ideas.
- ✓ Improved standard of living.
- ✓ It provides enough labour for the industries.
- ✓ It promotes businesses by providing markets for the goods and services.
- ✓ It brings social changes that alter (change) other elements of the social set-up.
- ✓ They promote production of goods in rural areas since they are centres of consumption.
- ✓ It promotes infrastructural development.
- ✓ Increased access to social services.
- ✓ Protection of the ecosystems since land and forests in rural areas is left idle.

2) PROBLEMS CREATED BY URBANIZATION

- ❖ Rural-urban migration creates a lot of problems.

❖ These problems are experienced both in the rural areas (places of origin), and in urban areas (areas of destination).

a) PROBLEMS IN THE RURAL AREAS

- Families break up.
- Lack of security since only women and children may be left in the village.
- School enrolment decreases.
- Food production decreases due to decreased labour.
- There is economic stagnation because of decreased output.
- Criminals are haboured in the abandoned and neglected houses.
- Poor services as energetic people migrate to towns. For example, unmaintained roads.

b) PROBLEMS IN THE URBAN AREAS

✓ Diseases easily spread.
✓ Pressure on social services such as schools and hospitals.
✓ Traffic congestion especially during rush hours.
✓ Drug and substance abuse.
✓ High levels of unemployment.
✓ Increased rates of crime, such as robbery.
✓ Shortage of housing that leads to creation of slums.
✓ There is a lot of air, water and land pollution.
✓ Environmental degradation (deterioration) that results from poor waste disposal, clearing of forests for settlement and gases from industries and cars.
✓ Low food production due to loss of agricultural land to developmental projects.

SOLUTIONS TO CHALLENGES ASSOCIATED WITH URBANISATION

a) PROBLEM OF TRAFFIC CONGESTION

✓ Provision of parking areas.
✓ Having traffic lights.
✓ Single-way streets.
✓ Constructing multi-lane streets to reduce traffic congestion.
✓ Construction of fly-overs.

b) PROBLEM OF ENVIRONMENTAL DEGRADATION (DETORIORATION)

✓ Expanding the existing sewage and garbage systems.
✓ Expanding water supply.
✓ Expanding electricity supply to reduce the demand on environmental resources.
✓ Expanding the existing recreational services.

c) THE PROBLEM OF UNEMPLOYMENT

✓ Vocational training to the people to be self-employed.
✓ Creation and expanding the industries to create jobs.
✓ Having good policies to attract investors.
✓ Provision of loans for people to start businesses than looking for jobs.
✓ Provision of good social services in rural areas to reduce rural-urban migration.

d) THE PROBLEM OF OVERCROWDING

✓ Building skyscrapers (upstairs).

- ✓ Provision of traffic lights.
- ✓ Develop rural areas to promote counter-urbanization and reduce rural-urban migration.

e) THE PROBLEM OF POOR HOUSING

- ☞ Provision of affordable accommodation to the urban poor people.
- ☞ Increasing the minimum wages for lower class workers.

ENVIRONMENTAL RISKS ASSOCIATED WITH SETTLEMENTS

- ☞ Substandard housing in some areas. These are breeding grounds for pathogens.
- ☞ Overcrowding in urban areas promote the spread of diseases.
- ☞ Poor sanitation also promotes the spread of diseases such as cholera.
- ☞ Lack of access to safe piped water.
- ☞ Deforestation since forests are cleared for settlement, firewood and charcoal.
- ☞ Increased air, water and land pollution.

HINTERLANDS

- ✍ These are areas that surround urban centres.

IMPORTANCE OF URBAN AREAS TO THEIR HINTERLANDS

a) Source of employment for residents of hinterlands.
b) They are centres of communication.
c) Urban areas provide better social services to residents of hinterlands such as hospitals and good schools.
d) They provide secondary inputs such as hoes for farming in the hinterlands.
e) They provide ready markets for the primary products of hinterlands (are centres of consumption).

1) FACTORS THAT HAVE LED TO THE GROWTH OF BLANTYRE CITY

- ☞ It has a good network of roads, railways and airport (Chileka International Airport).
- ☞ It is a centre for trade.
- ☞ It is a centre for industrial activities.
- ☞ It was a centre for missionary work for missionaries since the year 1876.
- ☞ Nearness to power supply such as Nkula and Tedzani power plants.

2) FACTORS THAT HAVE LED TO THE GROWTH OF LILONGWE CITY

- ✓ It is the capital city of Malawi. It was transferred from Zomba in 1974.
- ✓ Relocation of government offices from Blantyre to Lilongwe in 2005.
- ✓ The relocation of the parliament building from Zomba.
- ✓ It is a centre for industrial activities.
- ✓ It has a good network of roads, railway lines and airport (Kamuzu International Airport).
- ✓ It has fertile alluvial soils and flat land for farming.

THE FUNCTIONAL ZONES OF LILONGWE CITY

a) Capital hill sector

- This makes the city centre where most government offices are located.

b) Kanengo sector

- This is the major industrial area in Lilongwe, such as tobacco.

c) Old town sector

- This is a commercial sector.
- It is a centre for commerce.
- It is also partly an industrial site.
- It is used for recreation and residence.

d) Lumbadzi sector

- This is where Kamuzu International Airport (KIA) is located.
- It is also an industrial area.
- Also for commerce, institutions, residence and farming.

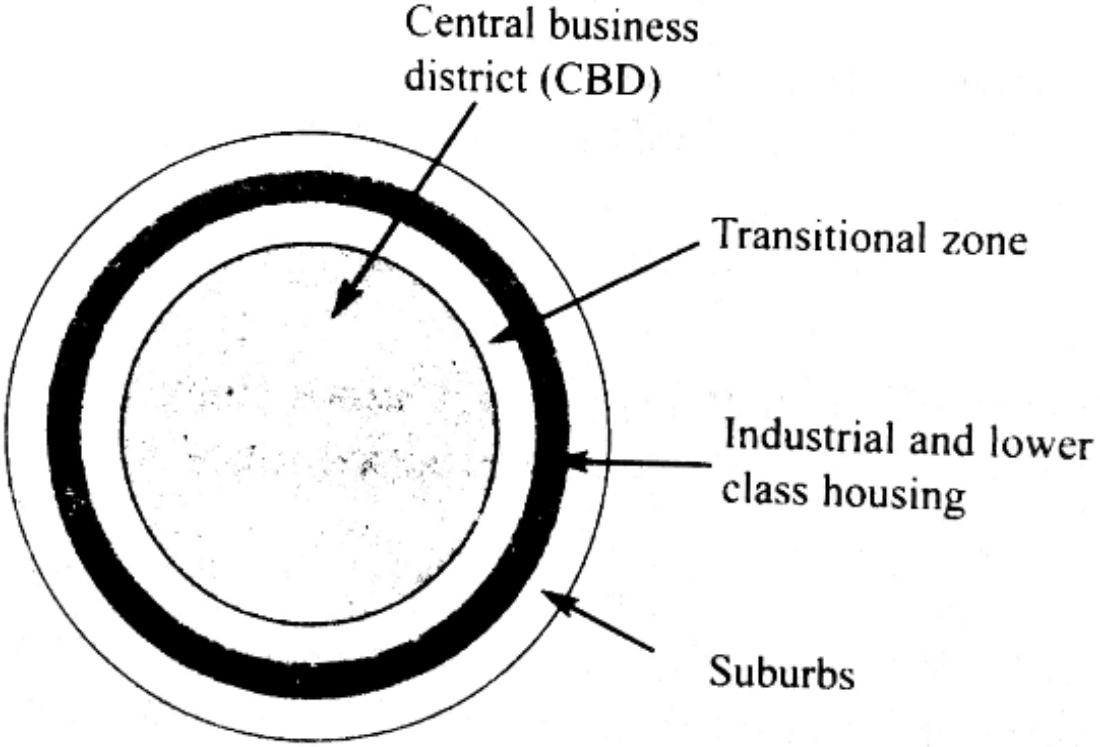
3) FACTORS THAT HAVE LED TO THE GROWTH OF MZUZU CITY

- It is a centre for trade.
- It has good accessibility by roads and airport.
- The growth of industries which create employment.
- It has good social services such as Mzuzu central hospital.
- It was a centre for administration of the Tung estates which were around Viphya.

DIFFERENCES BETWEEN A CITY (SUCH AS MZUZU, LILONGWE AND BLANTYRE) AND A TOWN (SUCH AS RUMPHI, MZIMBA, KASUNGU, ETC)

i. A city has high population density while the population density for a town is low.
ii. A city has many functions (multifunctional) such as administration, trade, commerce, industrial activities while a town may be limited to a few functions or activities.
iii. A city is a large area whose most inhabitants live there while a town is a small settlement where most people commute from distant surrounding locations on a daily basis.

THE FUNCTIONAL ZONES OF AN URBAN AREA



❶ THE CENTRAL BUSINESS DISTRICT (CBD)

☞This is the centre of the city where shops, offices, banks, public buildings, entertainments, cafes, hotels, dry cleaners etc. are located.

CHARACTERISTICS OF THE CENTRAL BUSINESS DISTRICT (CBD)

✓ There are less or no residential houses.
✓ It has tall buildings (skyscrapers) which are close to each other.
✓ Absence of manufacturing activities.
✓ It offers services such as banking, shops, etc.
✓ Land is expensive because of its high demand.
✓ There is a lot of noise during the day but quite at night.
✓ There is a lot of congestion during the day than it is at night.
✓ It is highly accessible since it is where the main routes from different locations meet.

PROBLEMS OF THE CENTRAL BUSINESS DISTRICT (CBD)

✍Traffic congestion resulting from increasing car ownership and commuting to work or for shopping.
✍Pollution resulting from litter, industrial fumes and noise.
✍High land value due to stiff competition.

❷ THE TRANSITIONAL ZONE (ZONE OF TRANSITION)

☞These areas still go through several developmental transformations (changes).

CHARACTERISTICS OF TRANSITIONAL ZONE

1) There is little manufacturing done.
2) High rates of social problems such as prostitution and crime.
3) It is mostly inhabited by the ethnic minority groups, with low income.
4) A small proportion is used for residential purposes.
5) It has poor housing which undergoes several changes.
6) It has high-rise flats, railway stations, terraced houses, etc. for commercial purposes.

PROBLEMS OF THE ZONE OF TRANSITION

❖ High unemployment rates.
❖ Abandoned warehouses.
❖ High crime rates.
❖ Poor quality housing.
❖ Overcrowding.
❖ Lack of open and parking spaces.

❸ INDUSTRIAL AND LOWER CLASS RESIDENTIAL

CHARACTERISTICS OF INDUSTRIAL AND LOWER CLASS RESIDENTIAL

➢ It has high population density.
➢ Land is relatively cheap.
➢ It is occupied by the working class.
➢ Poor quality housing.
➢ There are industrial activities taking place.
➢ Presence of narrow and crowded streets.

PROBLEMS IN THE INDUSTRIAL AND LOWER CLASS RESIDENTIAL

☞Air pollution from industrial fumes and cars.
☞A lot of heavy traffic transporting goods for the industries.

❹ OUTER SUBURBS (HIGH CLASS HOUSING) OR COMMUTER ZONES

☞These are mostly occupied by rich people, located on the outermost parts of urban areas.

CHARACTERISTICS OF OUTER SUBURBS

- It has wider streets.
- Land is expensive.
- There is low noise and free from pollution.
- Little public transport since many people own their own cars.
- It has low population density.
- It has big, modern houses and council estates.
- It has new shopping centres, small modern factories and open spaces.

PROBLEMS OF THE OUTER SIUBURBS (COMMUTER ZONES)

- Higher cost of journey to work places.
- High cost of housing.
- Long commuting time. This increases chances for accidents and being late for work.
- Little sense of community life people mind their businesses and live in fenced houses.

POLICY IMPLICATIONS

- In view of all the above problems that are created due to urbanization, the government needs to formulate and implement policies that are relevant to the current situation, if the problems of urbanization are to be addressed.
- **The policies could include, but not limited to the following:**

1) Elimination of the factor price distortions between the rural and urban areas.
2) Modifying direct linkages between education and employment.
3) Creating and expanding small-scale industries.
4) Encouraging (promoting) integrated rural development programmes.
5) Improve rural areas in terms of incomes and employment opportunities.
6) Reduction of imbalances between the economic opportunities in the rural and urban sectors.

TOPIC 4: TRANSPORT AND TRADE

TERMINOLOGIES

1. **Transport**
   - It means the carrying of goods and people from one place to the other.
2. **Communication**
   - It refers to the exchange of words and messages.
3. **Trade**
   - It is the buying and selling of goods and services.

TYPES OF TRANSPORT

a) Land transport

This is the use of railways, roads and pipelines.

b) Water transport

This is the use of inland waterways, such as rivers, lakes, oceans and canals.

c) Air transport (this is the use of planes)

FACTORS THAT INFLUENCE THE TYPE OF TRANSPORT TO BE USE

- ✓ The cost of transporting the items.
- ✓ The nature of the items to be transported. Water or rail transport may be preferred for bulky goods.
- ✓ Speed with which the items need to be transported. For instance, perishable goods (goods that easily go bad) such as flowers and fruits need to be transported on fast modes of transport while heavy goods like coal may be transported slowly by cheapest means of transport.

ADVANTAGES AND DISADVANTAGES OF DIFFERENT MODES OF TRANSPORT

A. LAND TRANSPORT

ADVANTAGES OF ROAD TRANSPORT

i. Roads can be constructed almost anywhere.

ii. They are cheap over short distances.

iii. They form direct links between producers and consumers.

iv. They are fast over short distance, hence they are convenient.

DISADVANTAGES OF ROAD TRANSPORT

i. High cost of building new roads and repairing old ones.

ii. Occurrence of fogs and ice in some areas cause accidents and blockages respectively.

iii. Vehicles carry small quantities of goods.

iv. Heavily congested in towns and on major motor ways.

v. They cause strain (tiredness/fatigue) for drivers.

vi. They cause noise, air and visual pollution, acidic rain and global warming.

vii. Roads cannot be constructed through dense forests and in hilly areas.

DIFFERENT NAMES FOR ROADS IN DIFFERENT PARTS OF THE WORLD

- ❖ In USA and Malawi roads carrying most traffic are called ***Highways***.
- ❖ In United Kingdom (UK) they are called ***Motorways***.
- ❖ In Germany they are called ***Autobahns***.
- ❖ In Italy they are called ***Autostrada***.

ADVANTAGES OF RAIL TRANSPORT

- It is relatively cheap over long distances with bulky goods.
- They carry large quantities of goods at one time.
- No truck congestion since they are limited to commuter trains.
- Not visually affected unless there is extreme snow, cold and floods.
- Are fast over long distances. For example in the commonwealth for Independent States (C.I.S), Japan and USA.

DISADVANTAGES OF RAIL TRANSPORT

- High cost of buying new trains and maintaining old trucks and new signaling.
- They are mainly limited to intercity passenger and freight.
- There is noise and air pollution.
- Railways usually follow flat land or nearly level land than hilly areas.

NOTE: Different names of railways that pass through tunnels underground in different countries.

- In London they are called ***Underground***.
- In Paris they are called ***Metro***.
- In New York they are called ***Subways***.

ADVANTAGES OF PIPELINES

a) They provide continuous flow.

b) They are fast.

c) There is no congestion.

d) They are useful for heavy liquids such as oil and gas.

DISADVANTAGES OF PIPELINES

a) They are expensive to construct and maintain.

b) They are not flexible once fixed.

c) They pose environmental problems of water and air pollution. For instance, the Trans-Alaska pipelines.

d) They can be vandalized by disgruntled people especially during times of war.

B. AIR TRANSPORT

ADVANTAGES OF AIR TRANSPORT

1. It is the fastest over all distances.
2. It is relatively cheap over long distances with bulky goods.
3. It causes little congestion.
4. It is comfortable over long distances.
5. It is not affected by physical barriers such as thick forests, deserts and oceans.
6. Direct routes can be followed.

DISADVANTAGES OF AIR TRANSPORT

1. Its carrying capacity is limited.
2. It is very expensive.

3. There are few internal airports which impede movements and accessibility.
4. Sometimes it is affected by bad weather, such as fogs which may cause accidents.
5. There is need firstly to obtain permission before airspace is used since it is paid for.
6. It causes noise, visual and air pollution.

C. WATER (OCEAN) TRANSPORT

ADVANTAGES OF WATER TRANSPORT	DISADVANTAGES OF OCEAN TRANSPORT
a. It carries heavy, bulky goods at once. b. It is the cheapest means of transport. c. It offers good comfort. d. There is little congestion since routes are wide. e. It causes no pollution unless oil tankers leak.	a. It is affected by bad weather, such as fogs, storms, etc. b. Very slow due to indirect routes. c. High cost of port dues and specialized ships. d. Presence of few coast ports. e. High construction and maintenance port costs.

INLAND CANALS

ADVANTAGES OF INLAND CANALS	DISADVANTAGES OF INLAND CANALS
➢ They are cheap over long distances. ➢ They carry bulky goods. ➢ They are good for recreation. ➢ Source of money in countries where they are found. ➢ They provide valuable shortcuts for ships.	➢ There are few routes. ➢ They are narrow. ➢ High construction and maintenance costs. ➢ When they have locks, ships sail slowly to complete the journey.

MAJOR WORLD TRANSPORT ROUTES

A. RAILWAY

1. The Trans-Siberian Railway

➢ It is about 9000km long. It has played a big role in the opening up of the Siberian and Russian steppes.

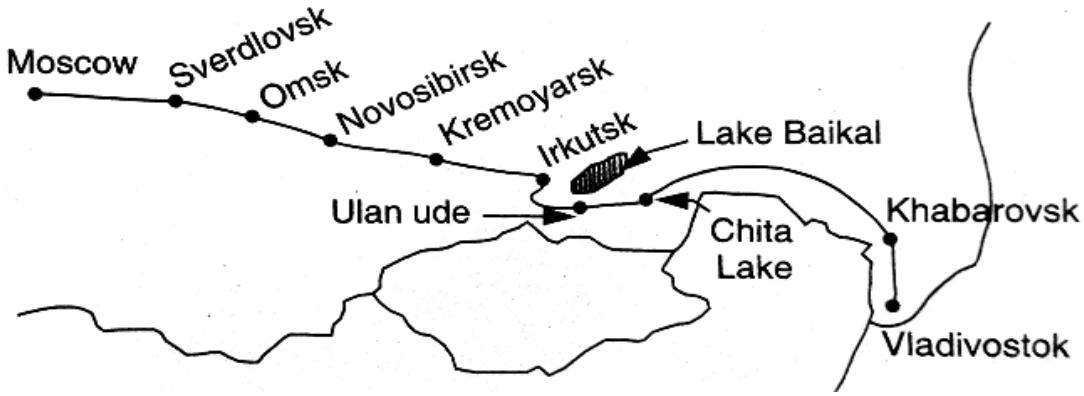
➢ It crosses Siberia from Vladivostok (in the east), to Moscow (in the west).

- **Commodities** transported include: ***coal, wheat, oil and rice***.
- It is a convenient passenger transport in Siberia.
- It has led to the growth of towns along it.

Importance of the Trans-Siberian Railway Line

- It is the only all year route for passengers across the former USSR, linking east and west.
- It has led to the growth of towns along it.
- It has helped in the opening of the Russian Steppes.
- It promotes trade in the region.
- It has led to the opening up of coal, iron and steel mines in the region.

The Trans-Siberian Railway



2. The Canadian Railways (Canadian National and Canadian Pacific Railway Lines)

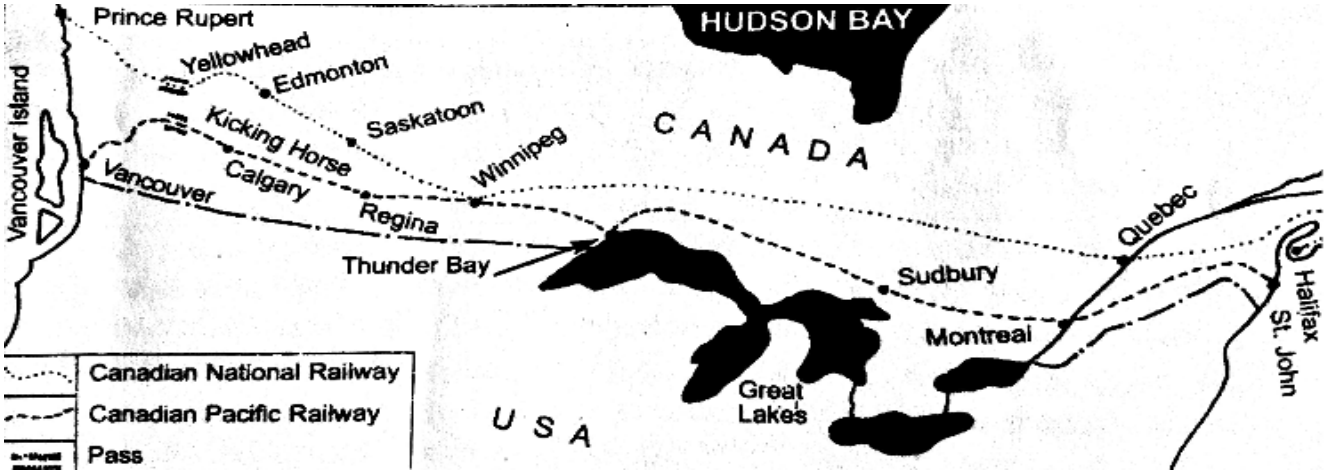
- The Canadian Pacific Railway is 4800 km long, and the Canadian National Railway is 5600 km long.
- They extend from Pacific to Atlantic coasts.
- It has helped in the opening up of Canadian Prairies where wheat is grown. This promotes easy access to both local and international markets.
- **Commodities** transported here include: ***wheat, pulp, paper, timber, iron ore, oil, fertilizer*** *and* ***coal.***

Importance of the Canadian National and Canadian Pacific Railway Lines

- They have helped in the opening up of the Canadian prairies where wheat is grown and exported.
- Helped in the opening up of prairie towns.

- Used to export some minerals such as iron ore, cars, car parts and manufactured goods.

Canadian National and Canadian Pacific Railway Lines



RAILWAY NETWORKS IN AFRICA

GENERAL FACTORS AFFECTING RAILWAY DISTRIBUTION

- The relief of the region. Gentle or flat lands promote railway construction while steep slopes or mountainous areas discourage its construction.
- The productivity or industrial productivity of the region in terms of agriculture, mining, encourages railway construction.
- Availability of fuel to be used by the railway.
- The degree of economic development of the region in which the railway is to operate
- The frequency of thunderstorms, landslides and sandstorms in the region through which the railway passes. Sand storms are very common in deserts.
- Political differences.
- Lack of enough capital to construct railway lines since they require big investments.

FACTORS INFLUENCING RAILWAY DISTRIBUTION IN AFRICA

a) NORTH AFRICA

❖ Has low railway connectivity because of the following reasons:

i. It is highly unproductive in terms of agriculture because of the presence of Sahara Desert.

ii. The demand for railway transport does not exist due to the presence of Sahara Desert.

iii. Sandstorms are common in this region, covering the available railways to great depths.

iv. It is sparsely populated since harsh climate and poor (infertile) soils push settlement to the coastal regions.

b) NORTH EAST AFRICA

❖ Railway connections are almost non-existent due to the following reasons:

i. The African plateau whose height varies between 900m and 1500m with deep valleys in between.

ii. The Ethiopian Highlands with their escarpments, deep valleys, discourage railway construction.

c) CENTRAL AFRICA

❖ It has low railway density because of the following reasons:

i. The equatorial climate with frequent thunderstorms and landslides.

ii. Low levels of economic activities and low productivity.

iii. The eastern part of Central Africa discourages railway construction due to the presence of mountains such as Kilimanjaro, Elgon and Ruwenzori.

d) SOUTHERN AFRICA

❖ It has the highest connectivity of railway lines because of the following factors:

i. High degree of economic development.

ii. Agricultural, industrial and mining activities are well established. For instance, mining takes place in South Africa, Zambia, Botswana and Zimbabwe; tea and tobacco production in Malawi, and manufacturing in South Africa.

iii. It has flat land.

iv. Trade is existent due to its high productivity.

Railway distribution in Africa

SELECTED CONTINENTAL AND REGIONAL RAILWAY LINES

1. THE TANZARA RAILWAY LINE

- It connects ***Dar-es-Salaam*** in ***Tanzania*** and ***Kapiri Mpochi*** in ***Zambia***.
- It is also called ***Uhuru Railway Line***.

IMPORTANCE OF THIS ROUTE

i. It promotes trade among countries, such as Malawi, Tanzania, Zambia and Zimbabwe.

ii. It helps in the transportation of raw materials from points of production to production plants (factories), and finished products to the markets.

iii. It also promotes development in the regions concerned.

GOODS TRANSPORTED FROM THE INLAND TO THE COAST

✓ Copper from Zambian copper belt.

✓ Tobacco from Malawi, Zambia and Zimbabwe.

GOODS TRANSPORTED FROM DAR-ES-SALAAM TO THE INLAND

- ✓ Diesel
- ✓ Petrol
- ✓ Paraffin
- ✓ Bitumen (for road making)
- ✓ Candles
- ✓ Seals
- ✓ Plastics
- ✓ Polishes.
- ✓ Clothes
- ✓ Cars
- ✓ Car parts

PROBLEMS OF THE TANZARA ROUTE

✓ Congestion of goods in Dar-es-Salaam.

✓ Insecurity especially where it moves in the volatile to civil wars.

2. THE NACALA CORRIDOR

- It connects Bilira (Nkaya) in Malawi to Nacala in Mozambique.
- It is the most alternative route to the sea in Malawi.
- Used by countries such as Malawi, Mozambique, Zambia, Zimbabwe and South Africa.

GOODS TRANSPORTED FROM MALAWI TO ZAMBIA, ZIMBABWE, SOUTH AFRICA AND MOZAMBIQUE

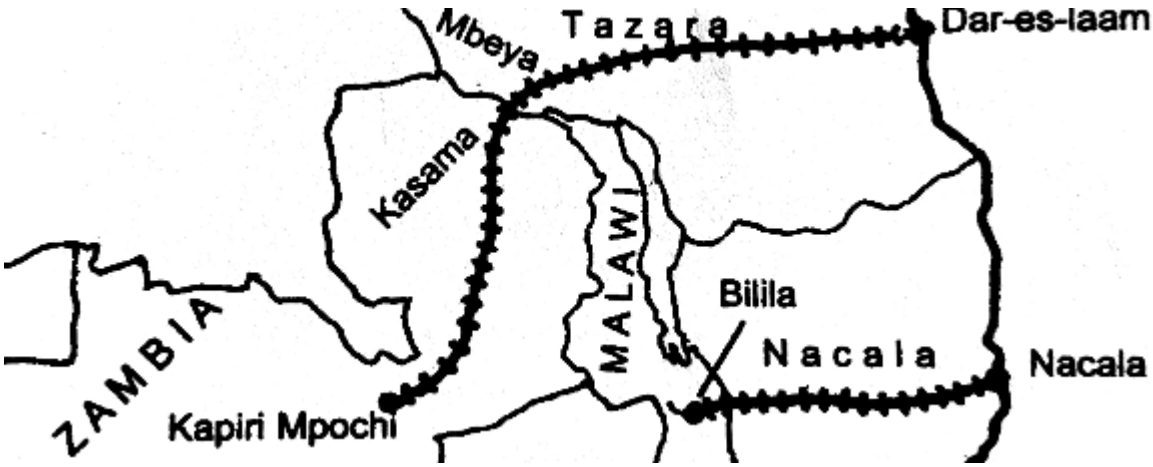
- Tobacco
- Cotton

- Tea
- Timber
- Sugar and

GOODS FROM THE COAST TO THE INLAND

- Lime for decorations and sugar making, gypsum for making cement, cars and car parts, petroleum products such as petrol and also other manufactured products.

The Tanzara and Nacala Railway Lines



REASONS FOR THE ABSENCE OF RAILWAY LINES IN THE NORTHERN REGION OF MALAWI

i. Most parts in the northern region of Malawi are mountainous, such as in Rumphi and Mzimba. This impedes (discourages) rail construction.
ii. The area is less productive in terms of agriculture and mining. This reduces the demand for rail transport.
iii. There is low level of economic development. For example, there are few industries since the region is located away from the major power stations of the country (such as Nkula and Tedzani). This reduces the demand for rail transport.

B. WATER TRANSPORT

LANDLOCKED COUNTRY

- It is a country which has no direct access to an ocean at its boarders.
- ✓ An example of a landlocked country is Malawi.

CHALLENGES FACED BE LANDLOCKED COUNTRIES

- High cost of importing and exporting goods from other countries.
- Increased transit time to import or export goods.
- Reduced foreign earnings since sea ports are viable earners of foreign currency.
- Importing and exporting goods may be affected by political instability in counties through which landlocked countries access the sea.

TYPES OF WATER TRANSPORT

a) **INLAND CANALS**

b) **OCEAN ROUTES**

INLAND WATERWAYS

- This is the use of rivers, lakes and canals.
- They involve the construction of canals, which shorten the transit time between trading countries.
- Example of a river that uses inland canals is Rhine River in Germany, an example a lake is the great lakes of North Africa.

CANAL

- It is an artificial way dug in the ground to allow ships and boats to pass through. Sometimes it is dug in order to join two water bodies.

EXAMPLES OF PLACES WITH CANALS

i. Peking linking with central China.

ii. Great Lakes in North America.

iii. The Panama linking Atlantic and Pacific oceans in Central America.

IMPORTANT CANALS

- The Suez Canal
- The Panama Canal
- The St. Lawrence Seaway

a. THE SUEZ CANAL

- It connects Mediterranean Sea and Red Sea.
- It is 160 km long.
- It was opened in the year 1869 (it was closed in 1967 and reopened in 1975).
- It has no locks.
- The ***main towns*** found at each end are ***Suez*** on the Red Sea side and ***Port Said*** near Mediterranean Sea.

Commodities shipped on Suez Canal Route from East and Far East to Europe

✓ Oil from the Persian Gulf region to North West Europe.

✓ Cotton

✓ Cars

✓ Tea

✓ Rubber

✓ sugar

Commodities shipped on Suez Canal Route from Europe to East and Far East

✓ Chemicals
✓ Paper
✓ Machinery
✓ Textiles
✓ Cars

IMPORTANCE OF USING THE SUEZ CANAL

1) It provides a good shortcut for ships from Far East to Europe.

2) It has no locks. This makes movement of ships with goods to be easier and faster.

3) It is an important source of money to Egypt.

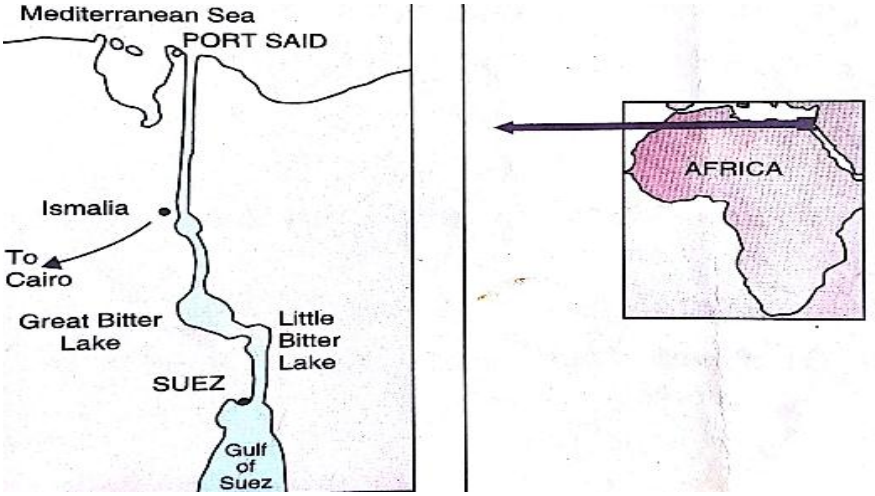
PROBLEMS OF USING THE SUEZ CANAL

1) Wars between the states of Israel and Arabs. For instance, the canal was closed in the year 1967 due to war between Arabs and Israelites.

2) The canal is narrow and shallow. This makes the super tankers (big ships), which carry heavy goods to be forced to use the Cape of Good Hope route which is very long.

3) Ships sail in this canal only in one direction.

The Suez Canal Route



b. THE PANAMA CANAL

➢ It is 80 km long.

➢ It connects the Caribbean Sea (Atlanta), and the Pacific Ocean.

- It has locks (three locks). This slows down ship movements.
- The main towns on each end are Panama City on the Pacific Coast and Colon on the Caribbean side.
- It was opened in the year 1914.
- It connects Asia, Australia, North America and South America to Europe.

Goods carried from the Far East and the Pacific States	***Goods from Europe and the Atlantic States***
Oil, copper, gold, nitrates, timber, wheat, dairy products, wool, meat, cotton, coffee, ores, etc.	Machinery, mining equipment, cars, drugs, textiles, newsprint chemicals etc.

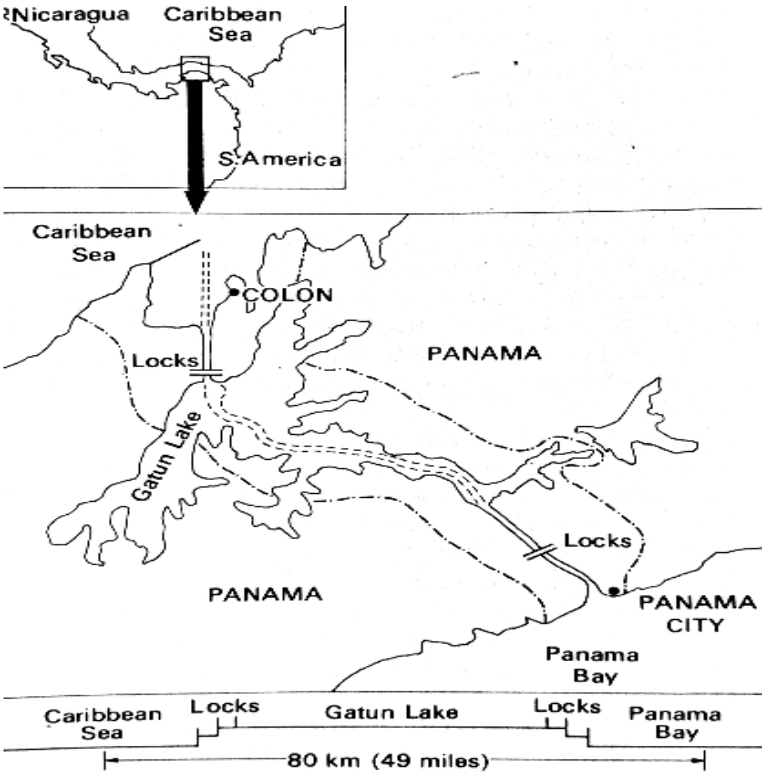
IMPORTANCE OF THE PANAMA CANAL

- It has improved trade of the Caribbean countries such as Mexico, Cuba, Jamaica, Venezuela and Central American States and Columbia, Ecuador, Peru and Chile.
- It helps in the domestic trade between the East and West Coast of the United States of America (U.S.A.).
- It reduces the sailing distance between East Coast of USA and Japan.
- It provides a safer travel than through the rough waters of the Cape Horn.

THE MAIN PROBLEM OF THE PANAMA ROUTE

- The presence of locks slows down the movement of ships.
- It has limited capacity since it cannot accommodate large ships and it is congested.
- It has limited water supply which limits its expansion.

The Panama Canal Route



c. THE ST. LAWRENCE SEAWAY

- It exists in the Great Lakes region covering Gary, Chicago, Detroit, Cleveland and Buffalo.
- It is joined by **Welland** and **Soo** Canals.
- The seaway is closed to shipping for four months a year due to the freezing of water in the St. Lawrence River.

IMPORTANCE OF THIS SEAWAY

i. It serves the industrial regions both in the U.S.A. and Canadian boarders.

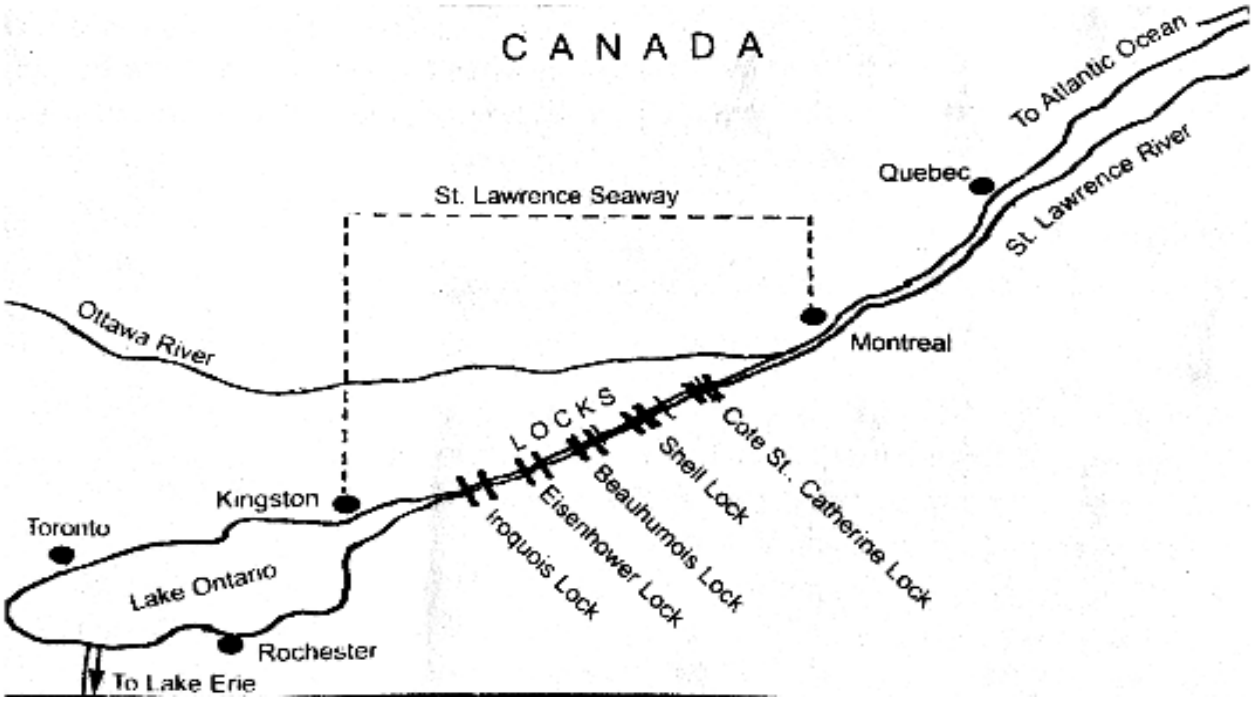
MAIN PROBLEM OF THE SEAWAY

- ✓ The seaway is closed to shipping for four months a year due to the freezing of water in the St. Lawrence River. This disturbs the transportation of goods.
- ✓ It is small, so large vessels cannot be accommodated.

Commodities shipped on the St. Lawrence Seaway

- ✓ Wheat, corn, soybeans, barley, oats
- ✓ Dairy products
- ✓ Iron ore
- ✓ Meat
- ✓ Industrial goods.

The St. Lawrence Seaway



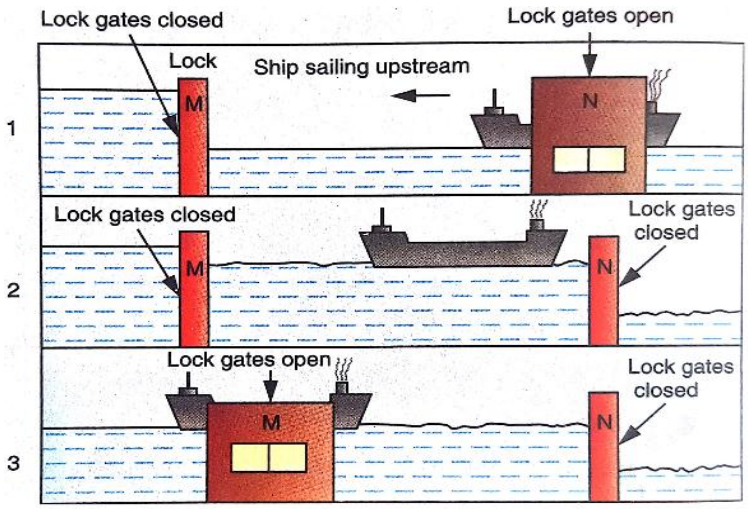
LOCKS

- These are gate-like structures that are used to raise and lower the water levels in canals for ships to move. This helps in the sense that water may be at different levels in canals.
- Lock operation is done by using ***sluices*** and gates that allow water to flow from one point to the other.

SLUICES: These are found below the water. When opened, water passes from one section to the other.

GATES: When they are opened, a ship passes from one section to the next.

LOCK OPERATION



Explanation

In stage **1**, as the ship approaches lock **N** from the east, the gates are opened so that the ship crosses.

In stage **2**, both gates at lock **M** and **N** are closed, and the sluices are opened so that water between **M** and **N** rises. As the water rises, the ship rises with it.

In stage **3**, when the water level between **M** and **N** and to the west of **M** is the same, the gates at lock **M** open and the ship passes through lock **M** to the other side.

OCEAN ROUTES

TYPES OF SHIPS (VESSELS) USED IN OCEANS

i.Passenger Ships (Liners)

- These carry passengers, mail and limited high amount of high value freight.
- They suffer from competition from air ways.
- Are called floating hotels or floating cities because they are self-contained with hall, shopping centres, swimming pools, postal counters and banks.

ii.Cargo Liners

- These carry people and freight (goods/general cargo).
- They follow scheduled routes.
- Many of them have refrigerators for carrying perishable goods.

iii. Cargo Ships (cargo boats)

- They carry freight. They include container ships, colliers for shipping coal and whalebacks for shipping wheat to main ships, refrigerator ships for transporting fruits, meat and dairy products.

iv. Bulk Cargo Ships

- These carry quantities of one type of goods such as oil, iron ore and wheat grain.
- They are big, loading and offloading is highly mechanized. For instance, oil tankers.

v. Container Ships

- These use containers.
- Containers are filled at the point of production and are sealed.

ADVANTAGES OF USING CONTAINERS

- Less manual labour is required as most of the work is done by machines.
- They minimize breakage and theft. Once sealed, they can't be opened on the way.
- It reduces the problem of sorting since goods are packed according to their type and size.

DISADVANTAGES OF USING CONTAINERS

- They require large and deep ports
- They require the use of specially designed lorries, trains and ships.
- They require specially designed crane equipment or forklifts.
- They require large areas at the port for storage.

vi. Others: Trap Cargo Ships (carry assorted cargo), Industrial Carriers (carry oil, bananas, grains)

FACTORS THAT INFLUENCE THE USE OF OCEAN ROUTES

a) Demand and Supply

- ✓ There must be goods to be carried and a market for them to go to.
- ✓ The greatest traffic is found on routes between regions where economic development is highest. For instance, on the North Atlantic route this connects highly developed Europe and America.

b) Availability of Ocean terminals.

c) Absence of physical barriers such as icebergs and strong winds.

d) Nature of cargo.

MAJOR WORLD OCEAN (SHIPPING) ROUTES

i. The North-Atlantic Route
ii. The Panama Canal Route
iii. The Trans-Pacific Route
iv. The Cape of Good Hope Route
v. The South-Atlantic Route
vi. The Suez Canal Route

NB: ***Take note that the Suez Canal and the Panama Canal Routes have already been discussed earlier in this chapter.***

1. **The North-Atlantic Route**

- ❖ This route connects North West Europe and North East America and North America.
- ❖ It is the busiest route. [**PORTS INCLUDE**: ***New York, Halifax, St. John, Southampton***]

GOODS TRANSPORTED ON THIS ROUTE

FROM NORTH WEST EUROPE TO NORTH EAST AMERICA AND NORTH AMERICA	**FROM NORTH EAST AMERICA AND NORTH AMERICA TO NORTH WEST EUROPE**
➢ Machinery ➢ Steel ➢ Fertilizers ➢ Textiles ➢ wine	➢ Copper ➢ Paper ➢ Tobacco ➢ Wheat ➢ Iron ➢ Cotton ➢ Timber ➢ Wood pulp and transport equipment

2. **The South-Atlantic Route**

- ❖ This route connects North-West Europe with South America.
- ❖ It is also called ***The Cape Horn Route.***

GOODS TRANSPORTED ON THIS ROUTE

FROM SOUTH AMERICA (EASTERN BRAZIL AND ARGENTINA) TO EUROPE	**FROM WESTERN EUROPE TO SOUTH AMERICA**
➢ Coffee ➢ Wheat ➢ Meat ➢ Cocoa ➢ Dairy products	➢ Manufactured products ➢ Semi-finished goods

REASONS WHY MANY SHIPS DO NOT USE THIS ROUTE

- ❖ It is affected by very strong and dangerous winds called ***The Roaring Forties***.
- ❖ Ship piracy.
- ❖ Limited availability of port facilities on the Southern tip of South America.
- ❖ It is very long. With the Panama Route, many ships use the Panama Route than the South-Atlantic Route.

3. The Trans-Pacific Route

- It is the longest in distance.
- It connects Yokohama in Japan, San Francisco or Panama via Honolulu and Hawaii.
- It has excellent prospects for counties bordering it.

GOODS TRANSPORTED ON THIS ROUTE

- Grain, mainly wheat
- Meat
- Dairy products
- Wool
- Manufactured products

4. The Cape of Good Hope Route (The Cape Route)

- ✓ It is the oldest route first used by Vasco da Gama on his discovery voyage to India.
- ✓ Used to be the main route connecting Europe and Australasia.
- ✓ Its importance started declining after reopening of the Suez Canal in 1975 (which was closed in 1967), which is shorter than this route.
- ✓ Ships travelling between Colombo and Southampton were saving 6440 kilometres.
- ✓ It is one of the present routes at the peak of modern trade.

Why The Cape of Good Hope route still remains relevant and important today?

- ✓ It accommodates large tankers (of over 20, 000 tonnes) which cannot use the Suez Canal.
- ✓ The war between the Arabs and Israelites make the Suez Canal Route unsafe, and is often closed. For instance, wars between these two groups (Arabs and Israelites) led to the closure of the Suez Canal Route in the year 1967, and reopened in 1975. This makes the use of the Cape of Good Hope the only option.
- ✓ The economic development of Southern African States and their production of minerals such as gold, diamond, copper and industrial production which makes this route important.

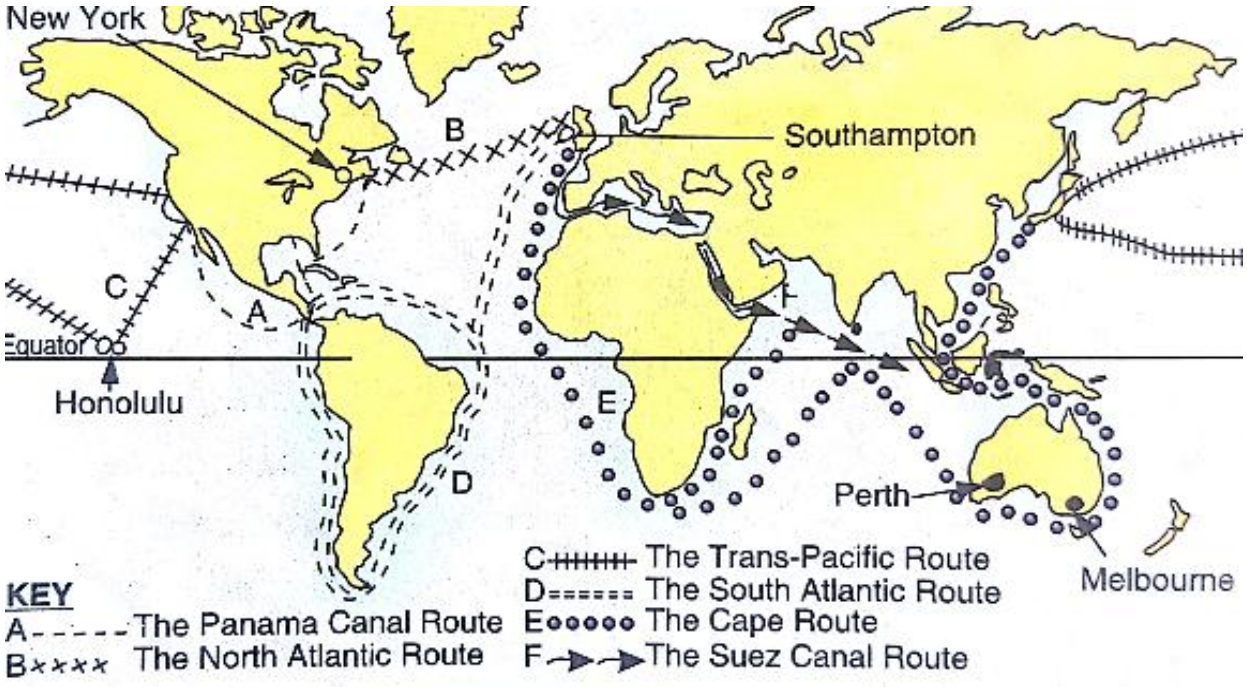
GOODS TRANSPORTED FROM WEST TO EAST

- ✓ Meat
- ✓ Oil
- ✓ Copper
- ✓ Cars
- ✓ Diamond
- ✓ Manufactured goods

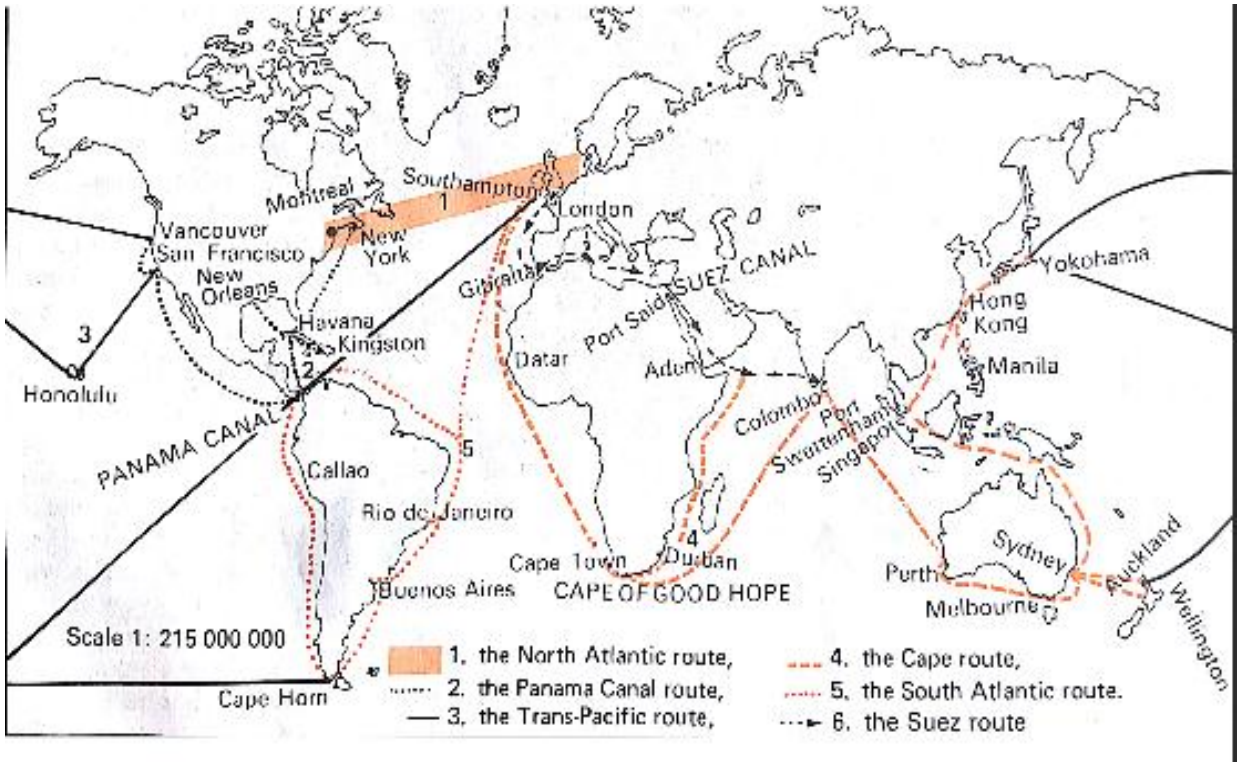
GOODS TRANSPORTED FROM EAST TO EUROPE

- ✓ Coffee
- ✓ Oil
- ✓ Copper
- ✓ Fruits
- ✓ Diamond
- ✓ Cotton
- ✓ Tea
- ✓ Groundnuts
- ✓ Tobacco
- ✓ Manganese
- ✓ Timber
- ✓ Rubber

World Shipping Routes (a)

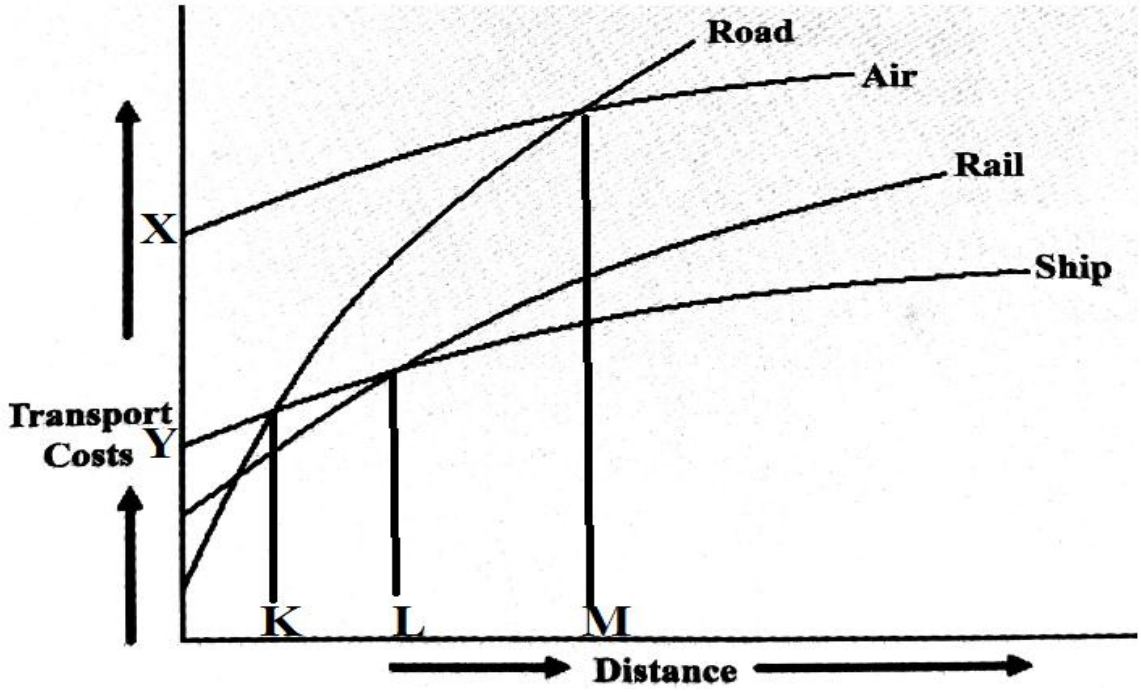


World Shipping Routes (b)



COMPARISON OF DIFFERENT TRANSPORT COSTS AGAINST DISTANCE COVERED

Comparative costs of Road, Rail and Ocean (Water/Ship) Transport



- The choice of type of transport to be used depends on the speed and cost of transport and the nature and the type of goods to be transported and the distance to be covered.

- Over short distances, road transport is cheapest than rail transport and ship.
- The ship is a very expensive means of transport over short distances.
- Over long distances, the ship is the cheapest means of transport and the road is the most expensive.

- At distance **K**, the road and rail transport costs are the same, **Y**. At this distance, the cost of water transport is way above road and rail transport cost.

- At distance **L,** the road and ship costs are the same, **X**. These are higher than the rail cost.

- At distance **M**, the ship and rail transport costs are the same, below the road transport cost.

- Beyond distance **M**, ship transport cost is the cheapest of the three means of transport. The road is the most expensive.

FACTORS THAT INFLUENCE THE TYPE OF TRADE OF A PARTICULAR REGION

i. Presence of natural resources such as gold in South Africa and copper in Zambia.
ii. The degree of industrial development. For example, South Africa manufactures a lot of products; she can therefore trade in many items.
iii. Geographical position of a particular country. A country can do trade with countries that have contrasting economies due to its geographical economies. This is called ***Entrepot Trade***.
iv. Tariffs and import duties often reduce trade among countries.

WAYS IN WHICH MALAWI WOULD BENEFIT IF SHIRE-ZAMBEZI WATER-WAY (NSANJE WORLD INLAND PORT) WAS COMPLETED SUCCESSFULLY

i. It was going to be a source of employment for many people.
ii. Source of government revenue through taxation on individuals and companies doing businesses, importation and exportation of goods, etc.
iii. Source of foreign exchange.
iv. It would have led to development of Nsanje district.
v. Since it is a short-cut, the transit time for importing goods to Malawi would be short.
vi. Malawians would be paying less on shipping for their imported goods by about 60%.

SOME POSSIBLE PROBLEMS IF THE SHIRE-ZAMBEZI WATER-WAY WAS COMPLETED

i. Water pollution, making it unsafe for domestic use.
ii. Depletion of aquatic species such as fish in Shire River due to water pollution.
iii. Congestion of goods at the port.

IMPORTANCE OF WORLD MAJOR TRANSPORT ROUTES

- Increased trade and industry.
- Improved standard of living.
- Rescue during emergencies and natural calamities (disasters), such as during wars.
- Creation of employment.
- It promotes international cooperation.

- It promotes labour mobility.

PROBLEMS OF WORLD MAJOR TRANSPORT ROUTES

- Fatal accidents
- Air pollution
- Noise pollution
- Depletion of fossil fuels
- Displacement of people and animals
- Loss of forests

REGIONAL AND INTERNATIONAL TRADE BLOCKS

TRADE BLOCK

- A trade block id a voluntary grouping of countries of a specific region where barriers to trade are reduced or eliminated among the participating countries.
- They may include the following: free trade area, customs union, common market, economic union and political union.

FREE TRADE AREA

- This is when a group of countries agree to eliminate tariffs, quotas and preferences on most goods and services that flow between them.
- In a free trade area, each member may impose its tariffs on goods from non-member states.
- Examples of Southern Africa Development Community (SADC) and Caribbean Free Trade Area (CARIFTA).

CUSTOMS UNION

- This is where member states set up common tariffs on goods of the non-member countries, while conducting free trade among themselves.
- Examples include: East African Community (AEC), Southern Africa Customs Union and the Customs Union of Belarus, Kazakhstan and Russia.

ADVANTAGES OF CUSTOMS UNIONS

- It increases efficiency.
- It promotes closer political and cultural ties among the member countries.

COMMON MARKET

- This promotes that factors of production such as labour and capital are free to move within the member states, expanding scale economies and comparative advantages.
- It increases productivity since the factors of production are efficiently allocated.
- Examples include: the Common Market for East and Southern Africa (COMESA) and the Central American Common Market (CACM).

ECONOMIC UNION

- It promotes harmonization of key policy areas such as the use of common currency.
- The member countries have both common policies on product regulation, freedom of movement of goods, services and the factors of production (capital and labour) and a common external trade policy.
- ✓ Examples include the European Union (EU) and the Union States of Russia and Belarus.

POLITICAL UNION

- This is when a group of countries share a joint government that is internationally acknowledged.
- An example is the United States of America.

1. COMMON MARKET FOR EAST AND SOUTHERN AFRICA (COMESA)

THE MEMBER STATES OF COMESA

- Angola
- Burundi
- The Comoros
- Djibouti
- Eritrea
- Mauritius
- Mozambique
- Namibia
- Rwanda
- Seychelles
- Sudan
- Swaziland
- Uganda
- Zaire
- Zambia
- Zimbabwe.
- Malawi

AIMS OR GOALS (OBJECTIVES) OF COMESA

- To ensure free trade among member states so that output of goods is increased.
- To achieve a big domestic market thereby improving economies of member countries.
- To ensure free movement of labour and capital among member countries.
- To improve commercial and economic cooperation in the region.
- To transform the structure of production of national economies in the region.
- To promote regional trade.
- To develop basic and strategic industries.
- To promote co-operation in agricultural development.
- To improve transport links.
- To create a regional common market.

NOTE: Since Jul 1984, member states agreed to reduce tariffs for selected commodities by between 10 to 70 %.

- COMESA traveler's cheques are also available.

PROBLEMS (CHALLENGES) FACED BY COMESA

- South Africa as an economic giant is not a member. This makes the group weak.
- Some members are also SADC members. This brings in confusions in the sense that a lot of attention is given to SADC than to COMESA.
- Some members do not want to reduce their tariffs because this acts as one of economic boosters for such countries.
- Corruption, inefficiency in leadership in some countries and low trade bargaining power.

2. THE SOUTHERN AFRICA DEVELOPMENT COMMUNITY (SADC)

- It was established in 1980.

THE MEMBER STATES OF SADC

- Angola
- Botswana
- Lesotho
- Mozambique
- Namibia
- Tanzania
- Swaziland
- South Africa
- Zambia
- Zimbabwe
- Mauritius
- Malawi

AIMS/GOALS (OBJECTIVES) OF SADC

- To achieve economic independence and self-sufficiency through increased trade.
- To improve transport and communication infrastructure to facilitate trade.
- To improve living conditions of people in southern Africa through the promotion of economic activity.
- To reduce economic dependency on South Africa.
- To establish links to form a true and equitable regional integration.
- To pool resources so as to encourage the implementation of national, interstate and regional policies.
- To work together to secure international co-operation within the framework of SADC's strategy for economic liberation.

PROBLEMS (CHALLENGES) FACED BY SADC

- Different political ideologies of member states (i.e. capitalism and communism).
- Individual SADC member counties are poor.
- There is no free market approach in the region.
- South Africa dominates since it is an economic giant. Many member states depend on it.

3. THE WORLD TRADE ORGANISATION (WTO)

AIMS/GOALS (OBJECTIVES) OF WTO

- To set and enforce rules for international trade.
- To provide a forum for negotiating and monitoring further trade liberalization.
- To resolve trade disputes.
- To increase the transparency of decision-making processes.
- To cooperate with other major international economic groupings.

PROBLEMS (CHALLENGES) FACED BY WTO

- The work overload on the WTO members the WTO secretariat.
- Dissatisfaction of developing countries over the balance of gains and adjustments between developing and developed nations in recent rounds of multilateral negotiations, especially the Uruguay Round.
- The impact of recent WTO rules on domestic economic and social conditions that traditionally have been influenced through domestic political decision-making processes.

❖ Pressure from the non-governmental organizations such as on issues of increasing transparency on WTO.

BENEFITS OF REGIONAL TRADE AGREEMENTS

- They promote economic development through expanded markets.
- They promote business incentives and protection.
- They promote resource allocation in that countries focus much on the production of goods they do best for exports.
- They promote international cooperation.
- They promote competition in trade which results in low prices and high quality products.
- There is rational division of labour and specialization of production among member states.
- The local market is expanded to cater for all goods produced and services provided.

CHALLENGES OF REGIONAL TRADE AGREEMENTS

- ✓ Political instability such as wars and conflicts lead to insufficient diversification.
- ✓ There is stiff competition among the trade blocks.
- ✓ Disparity in the economic size of member states. This makes trade to be dominated by few rich countries.
- ✓ Diversion of trade due to the introduction of a common external tariff by a regional block on a non-member country.

THE ROLE OF CUSTOMS IN INTERNATIONAL TRADE

- ✍ **Protecting customers**. For example, a government may levy tariffs on products which could be harmful to the population.
- ✍ **Protecting local industries and employment**. Developing nations may put tariffs on some imported products to enable local industries survive and grow.
- ✍ **Revenue collection for the country**.
- ✍ **Retaliation**; a government may put tariffs on a trading partner if it has gone against the foreign policy objectives of the government.

CHALLENGES ASSOCIATED WITH CUSTOMS

- ❖ Poor quality products resulting from lack of competition on the market.
- ❖ Trade restrictions can reduced world trade, leading to increased unemployment.
- ❖ Increasing prices of imported goods encourages retaliation, leading to trade war.

TOPIC 5: INDUSTRY

PART 1: INDUSTRY IN GENERAL

INDUSTRY

- ➢ An industry is an activity which involves the production of goods and services from raw materials.

MANUFACTURING

- It refers to the conversion of inorganic and organic raw materials as well as refined materials, by mechanical or chemical means into new products.

FOOTLOOSE INDUSTRIES

- These are industries whose location is not influenced by the presence of raw materials.
- These industries employ smaller workforce which can easily be found.
- They produce in small quantities.
- Their goods are neither weight losing nor weight gaining, so transport costs do not change regardless of where the goods are assembled.

INDUSTRIAL INERTIA

- This is the tendency of an industry to continue remaining in an area even if the original factors change or no longer exist.
- This may include raw materials, or sources of power.

REASONS FOR INDUSTRIAL INERTIA

- ✓ High costs of physical transfers.
- ✓ Fear of disruption of the business.
- ✓ Proximity to labour with specialist skills and relevant experience.
- ✓ The desire to remain where the business has established its roots.
- ✓ Good transport and communication infrastructure.

CHARACTERISTICS OF INDUSTRIALISATION

- Production of goods by machines rather than by hand.
- Increasing in the proportion of the work force in manufacturing.
- Expanded markets beyond the local and regional limits.
- Accelerated technological innovation, emphasizing new inventions and applied science.
- Production is done in large, and well organized factories.
- Growth in the nationwide transportation and communication networks based on the rail, road, air and telephones.
- Steady increase in the size and predominance of cities.
- Increased capital accumulation for investment in expansion of production.
- Growth of large enterprises and specialization in all forms of economic activity.

ADVANTAGES OF INDUSTRIALISATION

a) Self-sufficiency

- This is where the country is able to provide consumable goods to people instead of importing them.

b) Diversification of the economy

- This helps reduce reliance on one or few products whose prices may greatly fluctuate on world markets.

c) Source of employment to people

- Many people are employed to work in different industries.

d) Improvement of people's standards of living

e) Earning of foreign currency

- When industrial products are exported, foreign currency is earned.

f) Utilization of resources

- The resources are fully utilized and helps in the production of products of high quality.

g) Urbanisation

- It has led to the growth of urban population as people migrate to urban areas to look for employment in the industries.

DISADVANTAGES OF INDUSTRIALISATION

a) Pollution from the industrial fumes and the disposal of waters into water bodies.
b) High unemployment levels since most of the work is done by machines.
c) Overconsumption of environmental resources, leading to damage of the ecosystems.
d) Overcrowding and congestion in urban areas resulting from rural urban migration.
e) Loss of traditional skills as most of the work is done by machines and computers.
f) Increased frequency and severity of natural disasters. Industrialization has led to loss of forest cover, leading to floods and droughts.

TYPES OF INDUSTRIES

i. Primary industry
ii. Secondary industry
iii. Tertiary industry
iv. Quaternary industry

1. PRIMARY INDUSTRY

- This involves the production, collection and extraction of raw materials or natural resources.

EXTRACTIVE INDUSTRIES

☞These are primary industries that relate to getting minerals from the ground.

Examples of Primary Industries

- ✓ Mining
- ✓ Quarrying
- ✓ Farming
- ✓ Hunting
- ✓ Fishing (drying and curing of fish)
- ✓ Forestry (growing of trees)

2. SECONDARY INDUSTRY

- This involves the transformation of raw materials into consumable products (that can directly be used by people).
- They process materials produced by the primary industries. (farming, fishing, etc.).

Examples of Secondary Industries

- ✓ Car manufacturing
- ✓ Sugar refining
- ✓ Cement manufacturing
- ✓ Textile manufacturing
- ✓ Cigarette making
- ✓ Soap manufacturing, etc.

3. TERTIARY INDUSTRY

- This is concerned with the provision (distribution) of products and social services to the people.
- They are also called **service industries** because they provide for the needs of the population.

Examples of Tertiary Industries

- ✓ Teaching
- ✓ Transportation
- ✓ Policing
- ✓ Commerce
- ✓ Entertainment
- ✓ Tourism
- ✓ Banking
- ✓ Hotels
- ✓ Medical and professional services
- ✓ Provision of electricity (for example, by the Electricity Supply Commission of Malawi-**ESCOM**) in Malawi
- ✓ Provision of water (for example by Northern Region, Central Region and Southern Region Water Boards).

4. QUARTENARY INDUSTRY

- This is concerned with research, dissemination of information (research findings) and advisory services to the government and to the general public.
- They provide information and expertise in different fields.

Examples of Quaternary Industries

- ✓ Universities
- ✓ Media houses
- ✓ Political policy units
- ✓ Research and development
- ✓ Administration
- ✓ Human resource
- ✓ Personal service

NOTE: ***Tertiary and quaternary industries are also called Service Industries.***

GROUPS (TYPES) OF MANUFACTURING INDUSTRIES

a) HEAVY INDUSTRY

- These use heavy/large machinery.
- They use large amounts of power.
- They cause a lot of pollution to the environment.
- The use large quantities of raw materials, hence they are located near the source of raw materials.

Examples of Heavy Industries

- ✓ Iron and steel making
- ✓ Ship building
- ✓ Railway engineering
- ✓ Aircraft and car industry
- ✓ Refining of metallic minerals such as aluminium, copper, and chemical industry.

b) LIGHT IND USTRIES

- These do not use bulky raw materials to produce goods.
- They are called "footloose industries" because they are not tied to the location of raw materials.

Examples of Light Industries

- ✓ Textiles
- ✓ Light engineering
- ✓ Electronic industry
- ✓ Printing
- ✓ Computer software industries
- ✓ Food processing
- ✓ Furniture making, etc.

c) COTTAGE INDUSTRIES

- There are specialized small-scale industries where the production of commodities takes place in the home and labour is supplied by the members.
- They use common machinery usually used in the home.
- It is unorganized in nature.

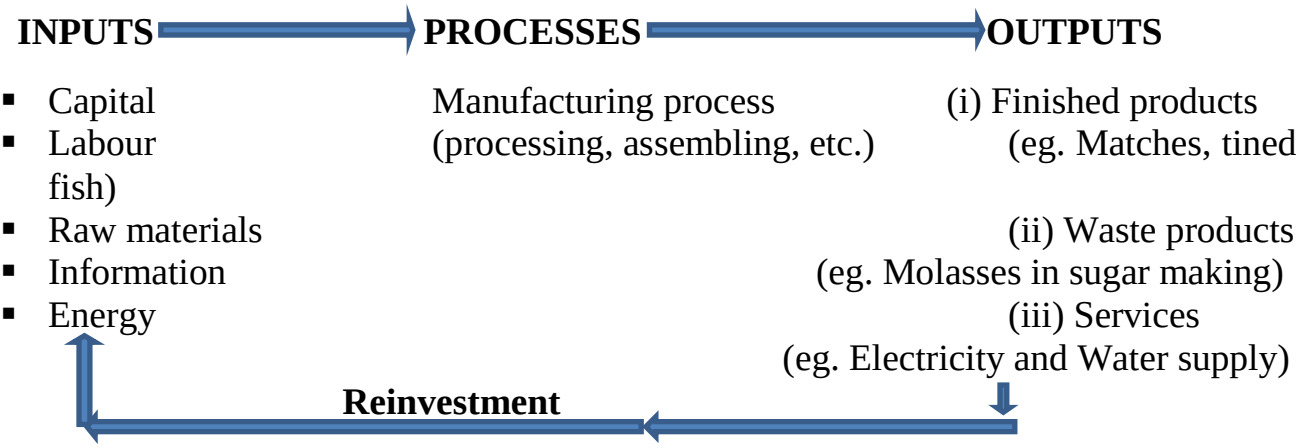
AN INDUSTRY AS A SYSTEM

- An industry is called a system because it is made up of interrelated parts which are ***inputs***, ***processes*** and ***outputs***.

CHARACTERISTICS OF AN OPEN SYSTEM

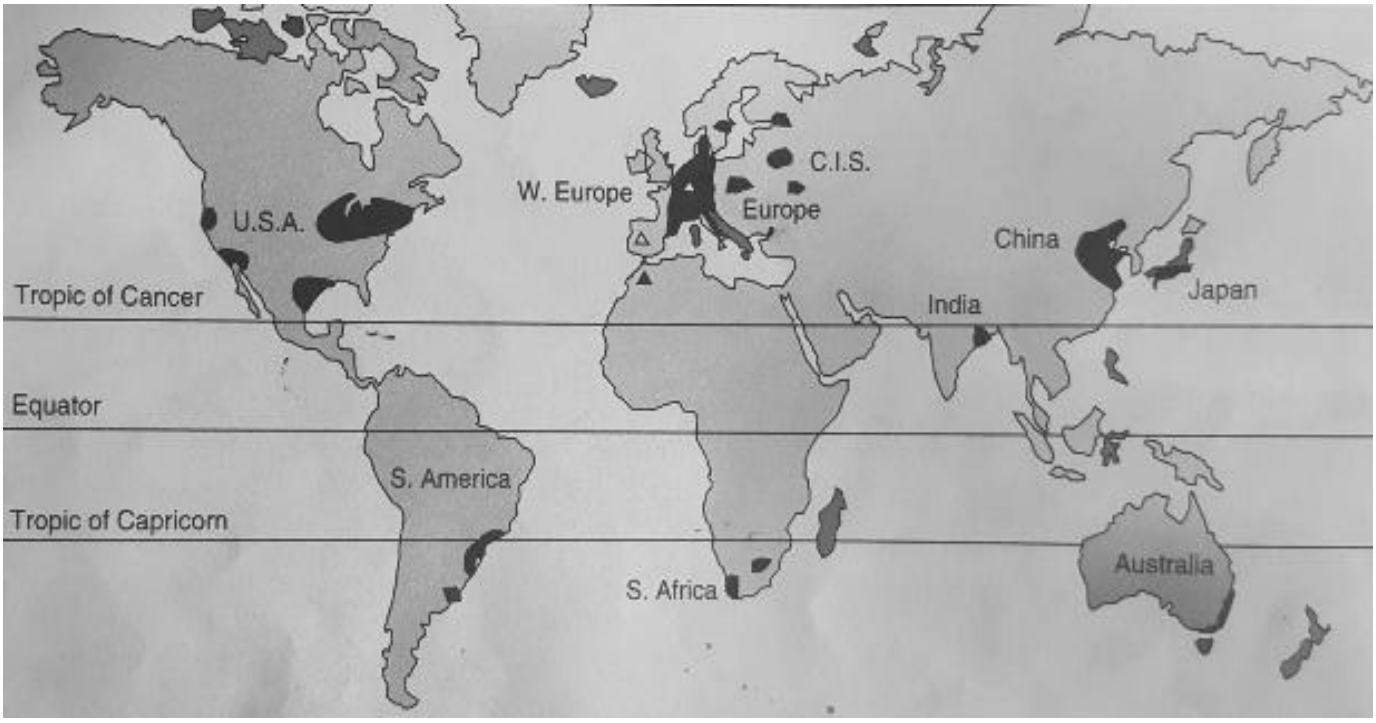
- It uses inputs from the environment.
- It converts (changes) inputs into outputs.
- It discharges outputs into the environment.

Example of how inputs, processes and outputs form a system



MAJOR INDUSTRIAL AREAS OF THE WORLD

Location of the Major Industrial Areas of the World



FACTORS THAT CONTRIBUTED TO THE GROWTH OF INDUSTRIES IN THESE AREAS

1. THE UNITED STATES OF AMERICA (NORTH EAST AMERICA)

- Availability of enough power and raw materials in the form of; coal, copper, aluminium, zinc, gold, lead, iron, steel, woolen textiles and hydro-electric power.
- Cheap transport for raw materials and finished products through the Great Lakes covering regions such as Detroit, Cleveland, Chicago, Buffalo and Garry.
- Skilled personnel since the population of North America is composed of immigrants from different advanced nations such as Germany, Britain, France, etc. These people have good experience in industries.
- The growing world markets and trade since it is well connected to Europe and other parts of the world by water transport.
- High population of America increases the demand for manufactured goods.

Examples of most industrialized countries in North America

- USA (with six major industrial reg ions)
- Canada

2. CHINA

- ❖ Abundant raw materials such as woolen textiles, iron ores, tin ores, coal and steel.
- ❖ Access to cheap water transport for raw materials and finished products.
- ❖ Abundant labour due to its high population.
- ❖ Readily available market for finished products due to its high population.

3. WESTERN EUROPE

- Abundant power supply in the form of hydro-electric power, coal and nuclear power.
- Plenty of raw materials, such as iron, steel and coal for the production of several products.
- Abundant labour supply due to its high population.
- Ready market due to its high population.

4. JAPAN

- Abundant supply of cheap hydro-electric power.
- Availability of extensive deposits of coal and aluminium.
- It is located in coastal regions, making importation of raw materials easy through water transport.
- Abundant labour supply due to high population.
- Available markets for the manufactured goods due to its high population.
- Government's decision to formulate a technically-based education system to boost the industry.

5. INDIA

- Large foreign exchange reserves that come from exportation of its abundant reserves of iron ore.
- Access to sea with good ports promotes importation of raw materials and exportation of manufactured products.

6. AUSTRALIA

- Abundant supply of hydro-electric power for industrial growth.
- Large deposits of bauxite ores, coal, iron and steel.
- Access to sea for easy importation of raw materials and exportation of manufactured products.

7. SOUTH AFRICA

- Large reserves of gold which is a raw material for making ornaments, backing, currencies, coinage and jewelry, gilding and dental fillings.
- An access to the oceans with good ports makes transportation of raw materials and manufactured goods easy.

FACTORS INFLUENCING THE LOCATION OF INDUSTRIES

A. PHYSICAL FACTORS

i. Availability of raw materials

- For instance, cars are manufactured near iron and steel materials.

ii. Presence and nearness to power supply

- Industries need to be located near power supply, such as hydro-electric power.
- For example, many industries in Malawi are located in the southern and central regions to be close to Nkula hydro-electric power scheme.

iii. Presence and nearness to water supply

- Water is used for cleaning raw materials, solvent, for cooling machines and as a raw material in industries.

- For example, the Mapeto Industry in Malawi which manufactures cloth from cotton need water for washing the fibres, the pulp and paper industry require water for cooling processes.

iv. Presence of flat land

- Flat and cheap land is important for the location of many industries.
- Flat land enables the use of machines, for example, transportation of raw materials from production points to production plants (where manufacturing is done).

B.HUMAN AND ECONOMIC FACTORS

i. Skilled and semi-skilled labour

- Skilled labour involves educated people with various expertise (skills) in different fields while semi-skilled labour involves support staff whose work does involve technical skills in certain skills.

ii. Capital

- Capital may be used for construction of infrastructure, for buying machinery, order of raw materials, payment of salaries, etc.

iii. Access to markets

- Industries that manufacture perishable goods such as foodstuffs, newspapers, soft drinks etc. need to be located close to markets for fast and easy selling.

iv. Transport

- Consideration of presence of transport in terms of rail, roads, trucks, tractors is important when locating an industry.
- This allows easy and fast transportation of raw materials to production plants, and finished products to consumers.

v. Political stability

- Peace and stability create a good environment for industrial location while wars and robberies can hinder investment because investors are afraid of losing their capital.

vi. Government (policies) and local influence

- Government actions influence the location of industries.
- The government can also formulate deliberate policies to designate certain areas as industrial areas.
- The policies need to be in line with the welfare of the people. Chiefs may be consulted before an industry is established in an area.

PROBLEMS THAT HINDER INDUSTRIAL GROWTH IN DEVELOPING COUNTRIES

1. Inadequate capital to set up and manage the industries.
2. Political instability (civil wars, political interference, etc.)
3. Lack of infrastructure [such as good roads, railways, lack of direct access to port (landlocked countries) which makes importation and exportation of raw materials and finished products slow and expensive.
4. Lack of expertise (*skilled labour force*) in many industrial fields.

ENVIRONMENTAL PROBLEMS OF INDUSTRIES

i. **Pollution**
- There is a lot of air pollution from smoke and toxic (poisonous fumes), water and land pollution from disposal of industrial wastes.

ii. **Deforestation**
- Vegetation is cleared to create towns, roads, settlements, etc.

iii. **Erosion of Traditional Values**
- Industries lead to urbanization. This makes traditional societies to lose their cultural identities.

iv. **Creation of slums (squatter settlements)**
- Most of the workers in industries are unskilled or semi-skilled. These people are under-paid, making them unable to afford good housing with high rentals.

DISASTER, HAZARD AND DISASTER RISK MANAGEMENT ISSUES RELATED TO INDUSTRIES

a) Acid rain resulting from industrial fumes.
b) Global warming
c) Ozone depletion
d) Floods and landslides since forests are cleared for settlements.
e) Epidemics such as HIV/AIDS.
f) Water pollution and contamination.
g) Technological hazards such as wars, oil spills, plane crash and fires.

THE ROLE OF INDUSTRIES IN DISASTER RISK MANAGEMENT

➢ In spite of the many industrial hazards, industrial innovations have been devised, leading to reduced numbers of people dying. The following are some of them:

✍ Technologies to help people accurately map disaster prone areas, to predict natural disasters and to issue early warnings to save lives.

✍ Automobile industries have enabled people to execute quick responses to disasters using airplanes or helicopters.

✍ Recycling industries prevent accumulation of hazardous wastes in the environment and subsequently lower the chances of disease infections.

✍ The education and research sectors have provided knowledge and information about disasters and their management.

✍ Construction of industrial structures to withstand forces of earthquakes, storms and floods.

PART 2: THE MOTOR VEHICLE INDUSTRY IN JAPAN

MAJOR INDUSTRIAL AREAS IN JAPAN

1) The Kanto region of Tokyo. This covers areas such as Chiba, Kanagawa, Saitama and Tokyo. This is **The Keihin industrial region**.

2) The Nagoya metropolitan area. This region covers Aichi, Gifu, Mie and Shizuoka. This is **The Chukyo-Tokai industrial region**.

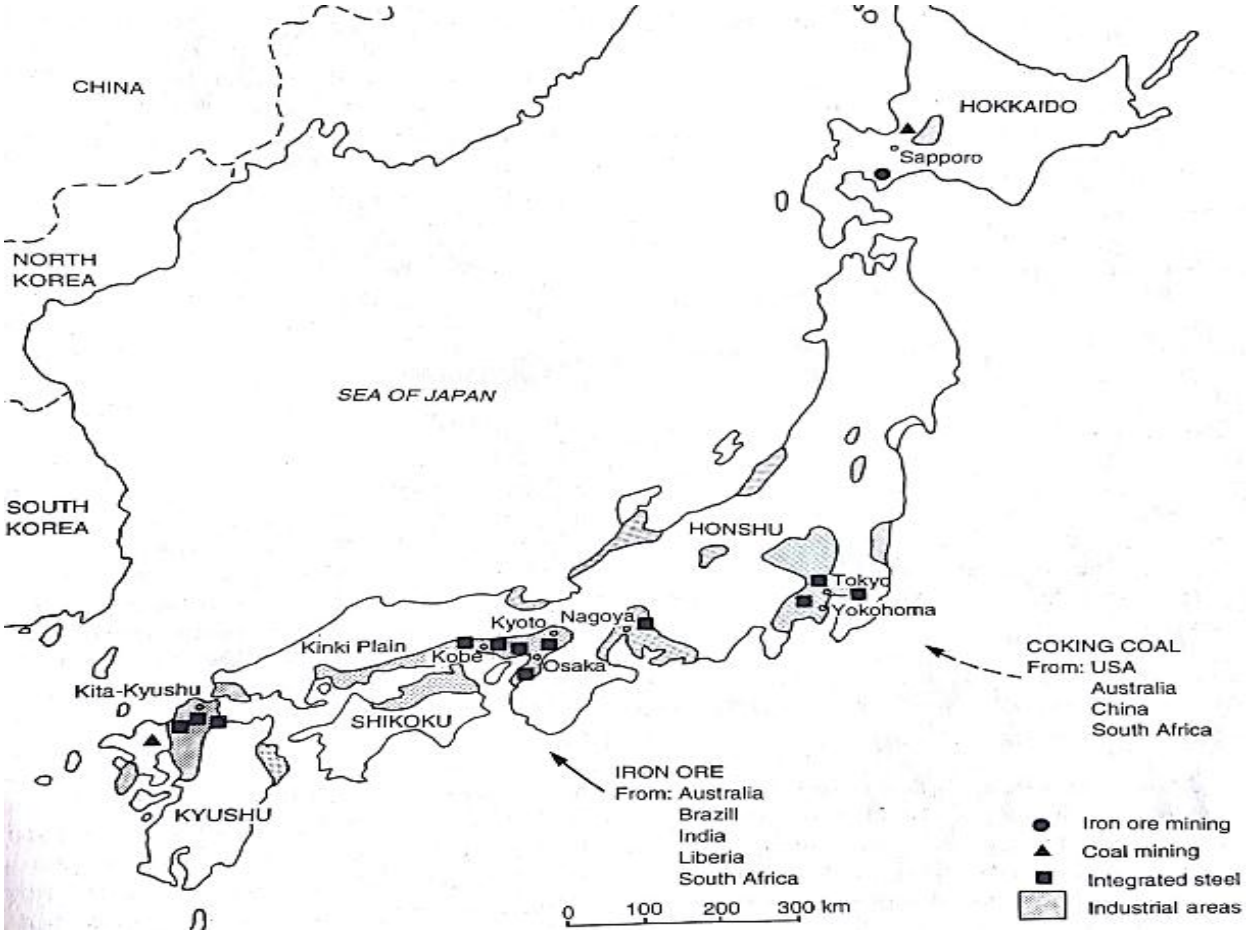
3) Kinki region. This is **The Keihanshin industrial region**.

4) The southern part of Honshu and northern Shikoku around the Inland Sea. This is **The Setouchi industrial area**.

5) The northern part of Kyushu (Kitakyushu).

6) The Toyota City, near Nagoya. This is the home of automobile manufacturers.

Major industrial regions of Japan



FACTORS FOR THE GROWTH OF THE MOTOR VEHICLE INDUSTRY IN JAPAN

a) **Availability of raw materials**: It has a lot of iron and steel mines, which provide the raw materials for making motor vehicles.
b) **Availability of capital**: The country has rich people who can afford expensive investments.
c) **Availability of power and energy resources**: Japan has a lot of coal that provide reliable and affordable energy for the production of motor vehicles.
d) **Presence of a ready market**: Japan has high population, which increases the demand for motor vehicles.
e) **Access to cheap water transport**: Japan is surrounded by big water bodies which makes transportation of bulky raw materials and manufactured cars to overseas markets.

f) **Skilled personnel**: Japan has skilled technicians with engineering skills to make cars.
g) **Presence of large cheap land**: This land provides enough land for the production plants and warehouses.

STAGES OF MOTOR VEHICLE PRODUCTION

1) Car body design
2) Building production technology
3) Production

CAR BODY DESIGN

- ❖ Engineers develop ideas for new models, by preparing sketches of car. This is done with the help of computers when developing basic drawings to help visualize the proposed vehicle appearance.
- ❖ They then make clay models that are studied by styling experts who are familiar with people's car needs.
- ❖ Aerodynamic engineers also review the models by conducting feasibility studies on crash tests.

BUILDING PRODUCTION TECHNOLOGY

- ❖ To produce beautiful styles visualized by the designers, car pressing machines for making body parts and frameworks are made.
- ❖ Tool designers start building the parts for the new model only after all models have been reviewed and accepted.

PRODUCTION

- Under this stage, we have the following:

a) Pressing

- ☞ Metal parts, such as roofs and bonnets are pressed out of steel sheets in a pressing machine.

b) Body welding

- ☞ The steel sheet parts that have been pressed are welded and the framework of an automobile body is created.

c) Painting

- ☞ Several layers of paint are applied to the assembled body, and polished to make it shine.

d) Assembly

- ☞ After painting, several interior and exterior parts are attached, including the engine, electrical wire, tires, etc. (about 20 000 to 30 000 parts make a complete car).

e) Inspection

- ☞ Before being released out of production, a completed car undergoes several tests for parts such as brakes, headlights, and emissions.
- ☞ The cars are then shipped as completed vehicles with outstanding quality.

OTHER PRODUCERS OF MOTOR VEHICLES

- USA

- United Kingdom (UK)
- West Germany
- France
- Italy
- USSR
- Canada
- Brazil
- Australia
- Sweden
- Czechoslovakia
- Spain

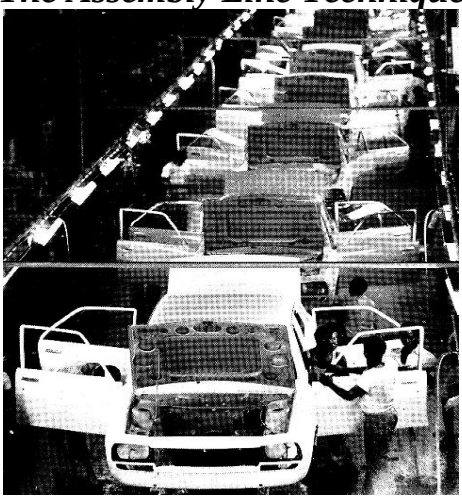
THE ASSEMBLY LINE TECHNIQUE

❖ The assembly line techniques leads to **mass production**. The technique is called ***taking work to the people.***

HOW THE ESSEMBLY LINE TECHNIQUE WORKS

The conveyor belts bring car parts to be assembled by the workers who are stationed at various assembly points along the assembly line. The workers are highly specialized in fixing different car parts as the conveyor moves the car slowly on the belt. By the time the car leaves the last point, it is ready for use.

The Assembly Line Technique



ADVANTAGES OF THE ASSEMBLY LINE TECHNIQUE (PRODUCTION)

☞ **It leads to speedy production**: This is so since each worker is highly specialized in fixed specific car parts.
☞ **These is easy maintenance**: When a part of a product breaks, it can easily be replaced with an identical part matching the item.
☞ **Reduced skill requirements**: This happens because it is easy to train new workers and the mastery of the skills comes fast.
☞ **Low labour costs**: Training requirements are not demanding, and nearly anyone can fill a spot on the production line. This makes companies to reduce expenses and easily replace employees who leave the work.
☞ **Greater employment opportunities**: Many people may find jobs since many workers are needed in fixing different parts.

☞ **There is easy automation**: This is the case since the machines may only be able to perform a limited number of specific tasks.

DISADVANTAGES OF THE ASSEMBLY LINE TECHNIQUE (PRODUCTION)

- Workers get low wages since they are less skilled.
- High capital and energy costs. The machines are expensive to buy and manage.
- It leads to boredom. Workers do the same work repeatedly, this limits creative thinking.
- Loss of craftsmanship. This means that no one person can claim to have produced the car, it is a collective responsibility.

ADVANTAGES OF AUTOMATION (ROBOT TECHNOLOGY)

a) It improves worker safety.

☞ Robots carry out tasks that can be dangerous for people, such as carrying heavy weights.

b) It promotes high product quality.

c) It leads to shorter working time for labourers.

d) It leads to higher production rates and increased productivity.

☞ This is possible because they can work all the time without getting tired.

e) Low cost of production since they can work over time without getting paid.

f) Reduced mistakes since they do not get bored when doing repetitive tasks.

DISADVANTAGES OF AUTOMATION (ROBOT TECHNOLOGY)

a) Huge capital investments: Robots are expensive to buy and maintain.

b) Loss of jobs: Robots take up the work to be done by people, increasing unemployment.

c) Robots cannot make decisions: Robots depend on human beings to carry out the tasks.

d) The need for expertise: Employees need training programmes on robots. This is time consuming and expensive.

e) The need for more safety measures: The presence of robots create safety problems.

IMPORTANCE (SIGNIFICANCE) OF MOTOR VEHICLE INDUSTRY IN JAPAN

- Creation of employment.
- Provision of foreign exchange earnings.
- Provision of government revenue through taxation.
- Provision of convenient, comfortable and relatively cheap personal transport.
- It promotes trade by making movement easy.
- It promotes enjoyment of leisure time.
- Development of infrastructure such as highways, airports and railway lines.
- Development of other industries such as paints and batteries.

PROBLEMS (CHALLENGES) FACED BY THE MOTOR VEHICLE INDUSTRY IN JAPAN

- **Global economic crisis**: This has reduced the demand for motor vehicles.
- **Natural disasters:** Earthquakes and Tsunamis damage the nuclear power plants, communication and gas systems. This leads to suspension of operations at times.
- **Recalls**: Some of the major companies such as Toyota Motors have been recalling several models of their cars for defects. This leads to losses. For example, in the year 2010, Toyota

recalled over 8 million trucks all over the world due to faulty accelerator pedals and breaking systems.

- There is stiff competition from other motor vehicle producers in the world.

PROBLEMS ASSOCIATED WITH THE MOTOR VEHICLE INDUSTRY IN JAPAN

a. Noise pollution.
b. Loss of jobs due to the introduction of the robot system in assembling cars.
c. It has led to increased road accidents hence, deaths and injuries.
d. It has led to traffic jams especially during rush hours.
e. Increased exploitation of fossil fuels due to increased car ownership.
f. It requires huge capital and sophisticated machine tools.
g. It has led to increased air pollution, leading to global warming and air-borne diseases.
h. There is a decline in public transport because many people own their personal cars.

OTHER INDUSTRIES THAT HAVE DEVELOPED IN JAPAN DUE TO THE MOTOR VEHICLE INDUSTRY

1) Tyre industries
2) Battery industries
3) Paint industries
4) Auto parts accessories industries
5) Steel industries
6) Iron industries

REASONS WHY THE JAPANESE MOTOR VEHICLE INDUSTRIES HAVE ASSEMBLY PLANTS IN MANY COUNTRIES AROUND THE WORLD

- ✓ To serve the scattered markets even in distant places.
- ✓ To increase production.
- ✓ To utilize cheap industrial land.
- ✓ To avoid import tax and hence, lower production costs.
- ✓ To reduce transportation costs since transportation of car parts is cheaper than the transportation of assembled cars.

REASONS WHY CAR OWNERSHIP IS LOW IN JAPAN DESPITE BEING A LEADING CAR PRODUCER

- High inspection fee on car owners for safety standards on regular basis.
- High parking fees.
- Japan has a deliberate policy to maximize foreign earnings to pay her huge imports.
- The domestic public transport system (such as trains) is very efficient.

JAPANESE CARS COMMON IN MALAWI

- Toyota
- Honda
- Daihatsu
- Mazda
- Nissan
- Suzuki
- Mitsubishi
- Isuzu
- Sabaru

- Yamaha
- Lexus
- Kawasaki

PART 3: THE TOURISM INDUSTRY

➢ It is the activity which involves people travelling and staying in places outside their usual surroundings for leisure or business for more than 24 hours but less than one year.

EXCURSIONISTS

✍ These are travelers who stay for less than 24 hours away from their home.

➢ Tourism involves interaction between the tourists and the indigenous (local) populations. The cultures of the two groups are different.

ASSIMILATION (ACCULTURATION OR ACCOMMODATION)

- It refers to the process and the results of interaction between groups with different cultures. *(Tourists and indigenous or local people).*
- Assimilation is also called **Acculturation or Accommodation**

DEMONSTRATION EFFECT

- It refers to the tendency of imitating the behaviour of others and assimilating it as one's own.

REASON WHY THE TOURISM INDUSTRY IS ALSO CALLED HOSPITALITY INDUSTRY

➢ It is because it involves creation of a friendly atmosphere in welcoming the tourists.

ELEMENTS OF TOURISM

- **Tourists**

☞ This is a person who visits places of interest.
☞ The tourists must have good health and should be inclined to travel.

- **Tourist generating regions**

☞ These are places where tourists come from.

- **Transit routes**

☞ These are routes used by tourists to visit places of interest.

- **Tourist destinations (attractions)**

☞ These are targeted places of interest. Places may be visited for their physical, cultural, historical or recreational service attractions.

- **Infrastructural facilities**

☞ These support the attractions, and their absence might deter the tourists from visiting the area. This may include accommodation and restaurants.

- **Disposable income**

☞ This is the money to spend on non-essentials such as transport, entertainment and other forms of hospitality in the host country.

- All the four elements must be present for tourism to take place.

KINDS OF TOURISTS

i. Psychocentric tourists

- These are tourists who prefer familiar destinations. They are not adventurous.

ii. Allocentric tourists

- These are tourists who prefer exploration inquisitiveness (willing to discover new places of interest).

FACTORS THAT PROMOTE TOURISM IN AFRICA

I. CULTURAL AND HISTORICAL FACTORS

- The way of life and civilization of a particular group of people will attract tourists.
- Cultural centres which offer traditional theatres and entertainment and historical places such as museums fall under cultural factors.
- For example, tourists travel from Europe to Egypt to see early places of civilization.

II. PHYSICAL FACTORS

- These include attractive places (scenery) such as lakes, national parks, game reserves, mountains, beaches, forests etc.
- In Africa, examples of these are Mulanje Mountain in Malawi, Kilimanjaro Mountain, Lake Malawi, Lake Chad, animals such as zebras, snakes, etc.

III. ECONOMIC FACTORS

These may include good shopping centres and improvements in the banking systems; such as internet banking and introduction of smart cards.

IV. POLITICAL FACTORS

- Most African countries are politically stable, with no civil wars. This attracts tourists since they are assured of safety as they visit places of interest.

V. PLEASANT CLIMATE

- The warm sunny weather conditions that prevail in many countries across the continent attract many foreign tourists from cold climatic regions.

VI. ACCESSIBILITY

- Most African countries are well connected to Europe, America and Asia by air. In addition, establishment of many car hires, travel agents, tour operators and improvements in road networks to destination places further promote the industry.

- Examples of international airports include Nairobi in Kenya, Lilongwe and Chileka in Malawi, Lusaka in Zambia, Harare in Zimbabwe, Lagos in Nigeria, etc.

ADVANTAGES OF TOURISM

- Tourists bring foreign exchange into destination places.
- Employment of local people in many occupations dealing with tourists. For instance, catering, transport and manufacturing.
- It puts destination countries on the world map. This helps promote other aspects of development.

- International standards are introduced into destination countries.
- It is a major source of revenue through taxation for many countries.
- It reduces migration.
- The overseas investment in airports, roads and hotels.
- It promotes cultural links with foreign countries and preservation of culture.
- It uses the resources in the natural environment, such as lakes, dams, mountains etc. to attract tourists.

DISADVANTAGES OF TOURISM

- ❖ Employment in the tourist industry is seasonal since tourists do not come all year round in large numbers.
- ❖ Local people cannot afford tourist facilities.
- ❖ Environmental degradation since promotion of small scale industries such as art and craft and construction of hotels along the lakes has led to loss of vegetation.
- ❖ Most hotels are owned by foreigners. Therefore, profits go overseas.
- ❖ Relocation of people since hotels are built next to beaches. People might lose their traditional means of livelihood as fishermen in the process.
- ❖ This industry erodes local cultures and traditions which force people to adopt foreign values ***(this is called demonstration effect)***. This results in prostitution, crime, drug and substance abuse, etc.

FORMS (TYPES) OF TOURISM

a) ECO-TOURISM

- This is a form of tourism that prevents bad effects on the environment but encourages good effects such as promotion of environmental conservation and the sustenance of the ecology. **OR: ECO-TOURISM** is a form of tourism that seeks to avoid adverse impacts and enhance positive impacts.
- It is a sustainable form of tourism whose aim is not to disrupt relationships between habitats of living things with their environment.
- ***Eco-Tourism*** is also called ***sustainable tourism***, ***soft tourism, responsible tourism, green tourism***, ***appropriate tourism*** or ***alternative tourism***.
- It involves cooperation of local inhabitants.

EXAMPLE OF ECO-TOURISM

① Gorilla-watching
② Mountain viewing in mulanje in Malawi
③ Game viewing in game reserves and national parks

ADVANTAGES OF ECO-TOURISM

- ➢ Local people benefit through knowledge as they are involved in decision-making.
- ➢ The environment is conserved and the ecosystem sustained since bad practices such as poaching are discouraged.
- ➢ Provision of entertainment through traditional dances.

- It creates employment.
- The visitors take the new ideas back home to influence their own environment.
- Local communities are involved in tourism in tourism through sales of hand crafts and supply of goods and services.

DISADVANTAGES OF ECO-TOURISM

- It reduces employment since less numbers of eco-tourists are involved.
- It promotes relocation of people to avoid disrupting the ecosystems.
- Lack of cooperation as local people want to continue with their traditional ways of life.
- It promotes the use of aircrafts to reach the remote destinations. This causes air pollution which leads to global warming.
- Small amount of money goes to local people. This discourages them.

b) MASS TOURISM

- It involves large numbers of people visiting places of interest for pleasure.

ADVANTAGES OF MASS TOURISM

- It brings more money to the country since many tourists are involved at once.
- Many people find employment, so it improves the welfare of people.
- It strengthens international relations since it brings together many people from different countries.

DISADVANTES OF MASS TOURISM

- It encourages environmental damage since more roads and hotels are constructed.
- This clears vegetation and damage agricultural land. This in turn repel than attract tourists.
- Pollution due to due to increased use of air crafts and cars. This leads to global warming.
- Loss of traditional values, beliefs and customs.

c) DOMESTIC TOURISM

- It exists where local people travel within the country to visit places of interest.

d) HEALTH TOURISM

- It deals with health workers and those who do not have knowledge in the field of health visiting places that offer medical services.

e) COMMON INTEREST TOURISM

- Both local and international people concerned with visiting places of interest.

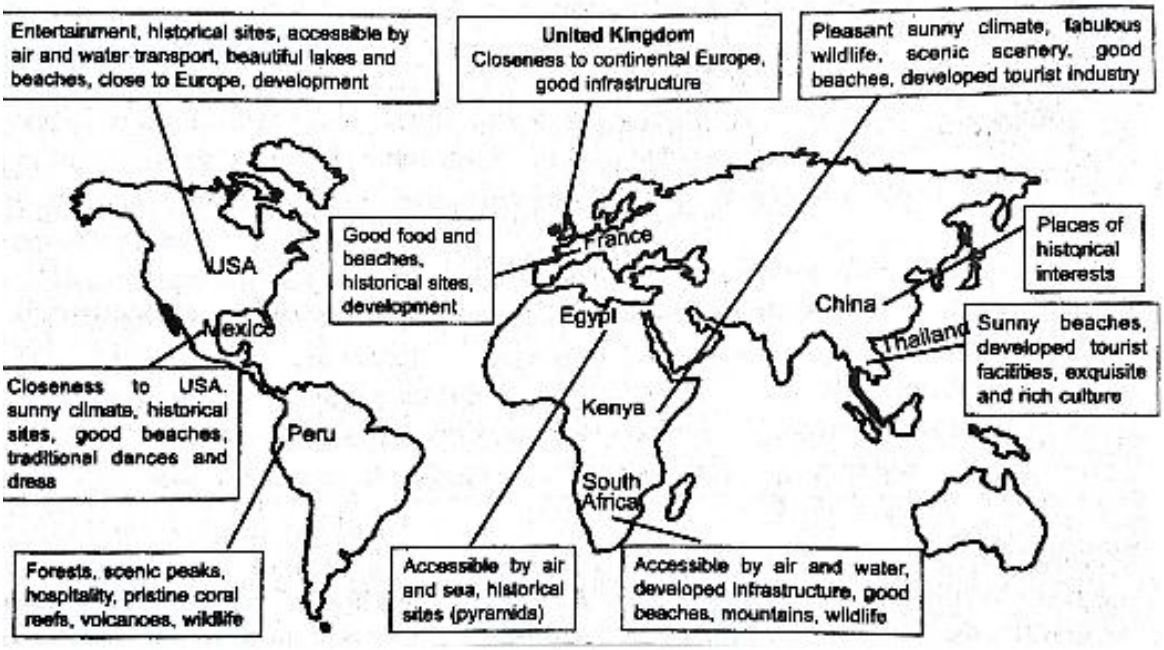
f) INCENTIVE TOURISM

- It deals with things attached to the visiting of places of interest. For example, commission.

g) CULTURAL (RURAL TOURISM)

- This form of tourism focuses on interacting with villages that have attractive and unique traditional ways of life, rich culture, nature, crafts, folk-lore and livelihood.
- Usually the tourists travel to learn from other cultures to broaden their perspective.

Popular Tourist Destinations of the World



TOURISM IN AFRICA

- Tourism in Africa is affected by negative image of corruption, poverty, crime, depravity (talk bad/depreciate) of the continent.
- This negative image discourages many tourists from visiting African places of interests.

SOME TOURIST ATTRACTION PLACES IN AFRICA

i. West Africa

- Tourism is not well developed because:
- This region does not have great natural attractions.
- Climate is not good.
- Wildlife is scare.
- There are not great mountains.
- The few attracted tourists come for colourful festivals and sites of historical interests.

ii. East Africa

- It has great tourist attractions. This is due to the following:
- Wildlife, coastal beaches, sunny climate, magnificent mountain scenery, palm-fringed beaches and culture.
- Kenya and Seychelles are the most important tourist sites in Africa.

iii. North West Africa

- This includes Algeria, Libya, Tunisia and Morocco
- These have warm and sunny climate, warm water for swimming etc.

iv. South-Central Africa

- Most tourists are from this region since it is located far away from Europe and America.
- Tourist attractions here include coastal beaches, national parks etc.

MOST POPULAR TOURIST DESTINATIONS IN AFRICA

a) The pyramids of Giza in Egypt.
b) The Victoria falls between Zambia and Zimbabwe. It is part of the Mosi-oa-Tunya National Park in Zambia and Victoria falls national park of Zimbabwe.
c) The Masai Mara National Reserve of Kenya.
d) Kilimanjaro Mountain in Tanzania. It is the Africa's tallest mountain.
e) Cape Town in South Africa. It has a table mountain and it is attractive.
f) Djenne of Mali.
g) Zanzibar in Tanzania with beautiful beaches and natural trading centre.
h) Marrakech in morocco is rich in culture and history.

TOURISM IN MALAWI

FACTORS PROMOTING TOURISM IN MALAWI

A) ATTRACTIVE SCENERY
- Natural resources such as Lake Malawi, Mulanje Mountain, beautiful game and evergreen vegetation in Lilongwe Nature Sanctuary, game reserves, etc.

B) CULTURE
- This takes the form of traditional dances (vimbuza, gulewamkulu, etc.). All these attract tourists.
- Malawi's good reputation for being welcoming, hence it is known to be "***the warm heart of Africa***."

C) POLITICS
- Tourist attraction centres in Malawi offer peace and calmness since there are no wars.
- There is also political will to develop tourism through opening and protection of areas of interest and promotion in the areas of sanitation and health.

D) CLIMATE
- Malawi has warm weather and sunshine in summer ideal for tourism. The seasons in Malawi are opposite those of Europe and America (when it is winter in Europe and America, it is summer in Malawi).

E) ACCESSIBILITY
- Malawi is easily accessed from Europe and America and neighbouring countries through air transport. For example, Kamuzu and Chileka International Airports.

URBAN TOURISTS ARE ATTRACTED TO MALAWI DUE TO THE FOLLOWING:

a) MZUZU
- Its attractive location and cool climate.

b) BLANTYRE
- For its hills such as Soche, Michiru, Mpingwe, Ndirande and Bangwe which offer great scenic beauty.

c) ZOMBA
- For its botanical gardens and historical sites such as war memorial, parliament buildings, etc.

d) LILONGWE

- For its precious and luxurious gardens in addition to the Lilongwe Nature Sanctuary.
- Besides being a nodal city (where many different important routes meet), it is the capital city of Malawi.

IMPORTANCE OF TOURISM TO MALAWI

i. It offers the most reliable source of foreign exchange.
ii. It has stimulated the growth of small-scale industries such as art and craft.
iii. It provides employment to many people.
iv. It has promoted the growth of agriculture and manufacturing sectors.
v. It has led to the improvement of roads, hotels, redevelopment of historical places.
vi. It promotes public relations and international understanding.
vii. Source of revenue to the government through taxation.

PROBLEMS FACING THE TOURISM INDUSTRY AND THEIR SOLUTIONS (INCLUDING IN MALAWI)

1) MALARIAL DISEASES

- This is a common problem in rift valley areas where many tourists go to see wildlife and spend time on the lake.
- The threat of illness may discourage tourists from visiting Malawi.

SOLUTION

- Using mosquito nets when sleeping.
- Using mosquito repellants.

2) BILHAZIA

- This is a common problem along lake-shore areas and in many rivers.

SOLUTION

- Avoiding urinating and defecating in water (in rivers and lakes).

3) INSUFFICIENT ACCOMMODATION

- Many hotels are not up to international standards.
- There are few hotels.

SOLUTION

- Construct hotels of high standards.

4) POOR COMMUNICATION AND INADEQUATE AIR TRANSPORT SERVICES

- There are insufficient air transportation services both to and within Malawi.
- Phone networks are very poor.
- Poor internet services which are very expensive.

SOLUTION

- Improve internet and phone services.
- Creation of more and good international airports.

5) ACCESSIBILITY

- Many roads leading to tourist attraction centres are impassable because they are in poor condition.
- They have potholes which become very bad during the rainy season. This makes places of interest not to be accessed by tourists.

SOLUTION

- Improving the condition of secondary roads that lead to those places of interest by making them tarred and or graveling them.

6) HIGH COST OF VISITING MALAWI FROM MOST GENERATING REGIONS

- Air fares, ground costs and hotel rates are high. This discourages tourists from visiting Malawi.

SOLUTION

- Reduce hotel rates, air fares and ground costs.

7) POOR PROMOTION OF MALAWI AS TOURISTS DESTINATION

- Less is done by the government to promote the tourism industry.

SOLUTION

- Political will and investment in the tourism industry.

8) ENVIRONMENTAL DEGRADATION (DEFORESTATION, EROSION, POLLUTION)

- This results from clearing of forests for construction of hotels, motels etc.

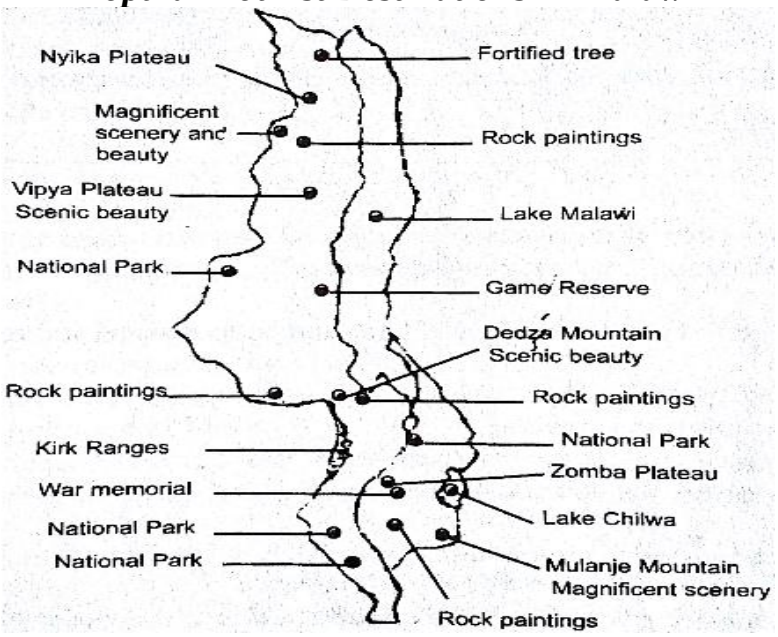
SOLUTIONS

- Afforestation
- Reforestation.

9) HEAVY TAX OR LEVY

- Governments levy tax on the client's services. This adds to the already expensive destinations in many parts of the world.

Popular Tourist Destinations in Malawi



PART 4: THE FISHING INDUSTRY

FISHING

- It is a primary industry that involves the catching of all aquatic animals including fish.

FISHING PIRACY

- It refers to the illegal fishing of endangered species.

NOTE: Most fish feed on planktons (microscopic plants) which are abundant in the following areas:

i. Where warm and cold ocean currents meet.

☞This promotes the precipitation of nutrients required for the growth of planktons.

ii. Where upwelling of cold water occurs.

☞Upwelling of cold water from the sea bed brings the nutrients accumulated on the sea bed towards the surface. This promotes the growth of planktons on which the fish feed.

iii. In shallow water near to landmasses.

☞In these areas a lot of sunlight penetrates the sea bed which promotes the multiplication of the planktons on which the fish feed.

iv. Where rivers join big water bodies such as oceans.

☞This is where large quantities of nutrients from the upstream are deposited by the river. The nutrients help in the growth of planktons on which the fish feed.

- Fish live and breed where the continental shelf is wide. In these areas, sunlight penetrates the epicontinental sea (sea above the continental shelf).

MAIN TYPES OF FISH CAUGHT

❖ Pelagic Fish

❖ Demersal Fish

a. PELAGIC FISH

- These are fish which breed near to the surface of the sea water.
- They migrate during part of the year along defined routes.
- The word ***pelagic*** comes from a Greek word ***palagos***, which means sea.

Example of Pelagic fish

i. Tuna
ii. Pilchard
iii. Mackerel
iv. Sardines
v. Anchovies
vi. Menhaden

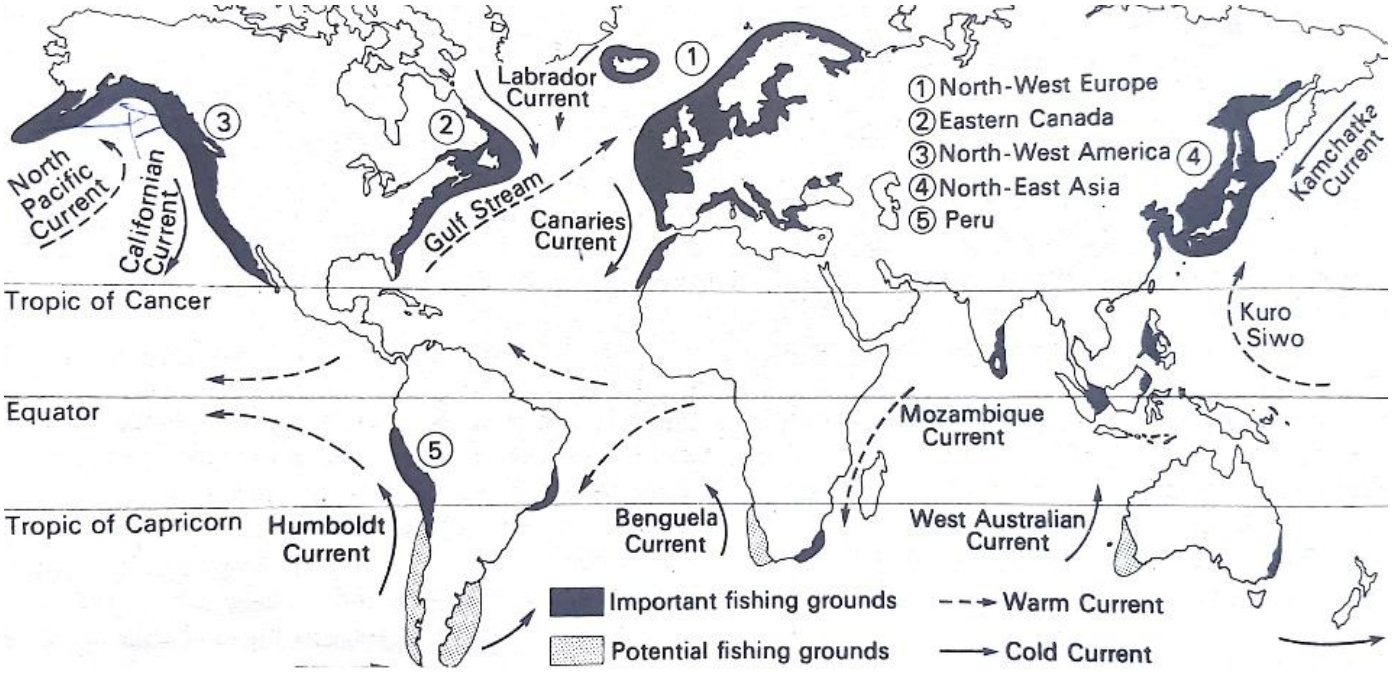
b. DEMERSAL FISH

- These are fish which live and breed on the sea bed (near the bottom of shallow seas).
- They do not move usually move far from their feeding grounds.
- ***Demersal*** comes from a Latin word ***de*** and ***mare***, which together means ***down sea***.

Examples of Demersal Fish

i. Sole
ii. Cod
iii. Haddock
iv. Halibut
v. Hake
vi. Skate
vii. Garoup
viii. Plaice
ix. whiting

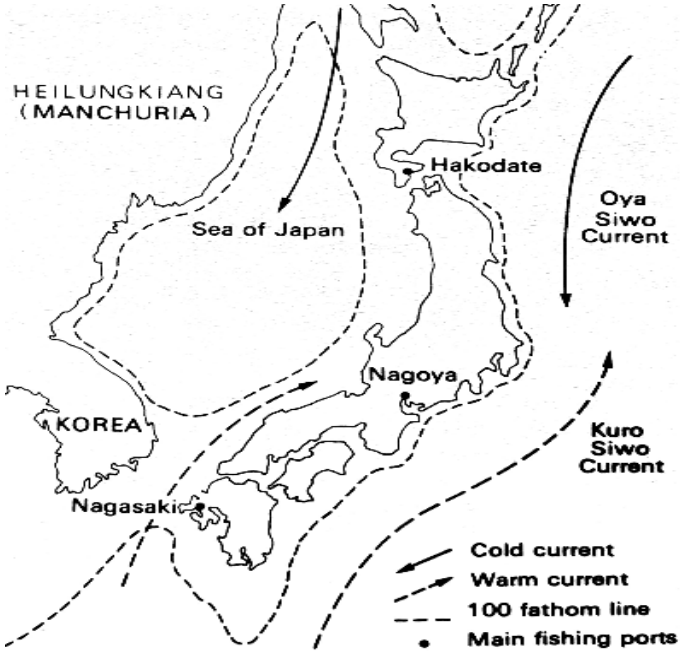
Location of Major Fishing Grounds of the World



A) NORTH WESTERN PACIFIC (NORTH EAST ASIA) FISHING GROUND

- It takes place in areas around Japan (the major fishing country).
- It extends from Bering Sea to the East of China.

North Western Pacific (North East Asia) Fishing Ground



REASONS WHY JAPAN IS THE MAJOR FISHING NATION

i. Japan does not have enough natural resources (80% of the land is not used for farming).

ii. Its dense population provides ready market for fish and fish products.

iii. The continental shelves around the islands of Japan are rich in planktons because of the meeting of warm Kurosiwo current and cold Oyashio current.

iv. Industrialization has made fishing to become scientific.

v. Absence of lowlands and pastures mean that very few animals can be kept for meat to provide proteins.

vi. The indented coastline of Japan provides shattered fishing ports, calm waters and safe land ideal for fishing. (Examples of important large fishing ports in Japan are Hakodat and Kushiro).

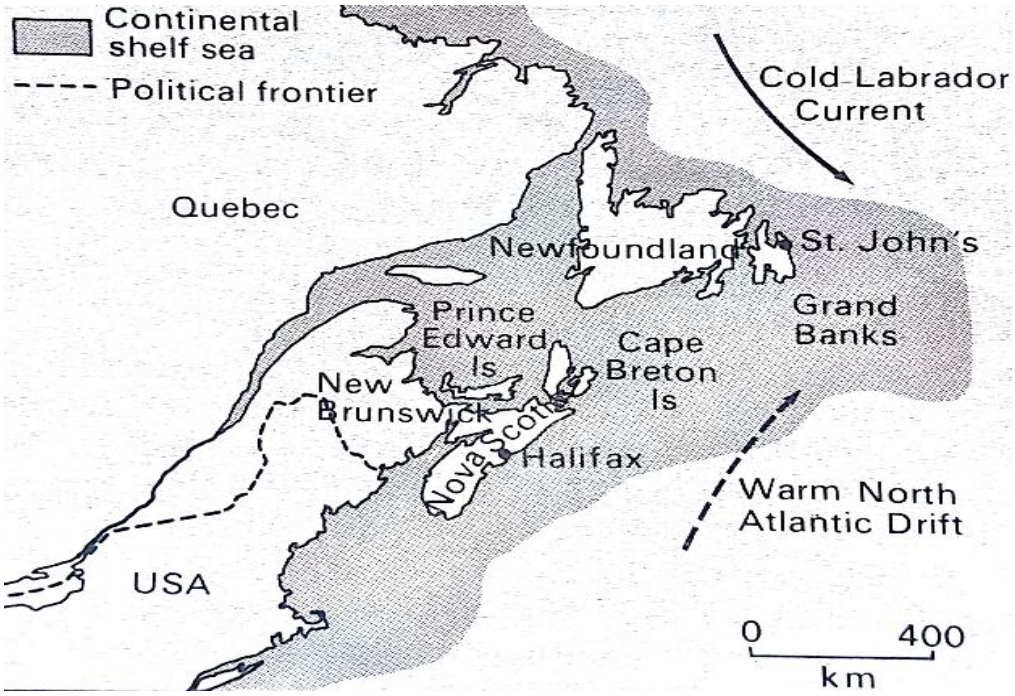
Examples of fish caught from the North Western Pacific/North-East Asia Fishing Ground

i. Cod
ii. Halibut
iii. Herring
iv. Salmon
v. Sardine
vi. Tuna (is overfished)
vii. Mackerel
viii. Bonito
ix. Mullet

B) NORTH WESTERN ATLANTIC (EASTERN CANADA) FISHING GROUND

- This fishing ground extends from Cape Cod to Newfoundland, off the coast of Canada in South America.
- The major problem is overfishing.

North Western Atlantic (Eastern Canada) Fishing Ground



REASONS FOR LARGE SCALE FISHING ON NORTH WESTERN ATLANTIC FISHING GROUND

- It has indented coast with good natural habours.
- Harsh climate and infertile soils force people to fishing.
- The meeting of warm North Atlantic Drift current and cold Labrador Current promotes the growth of planktons on which fish feed.
- Presence of shallow waters promotes the growth of planktons since sunlight penetrates for photosynthesis.

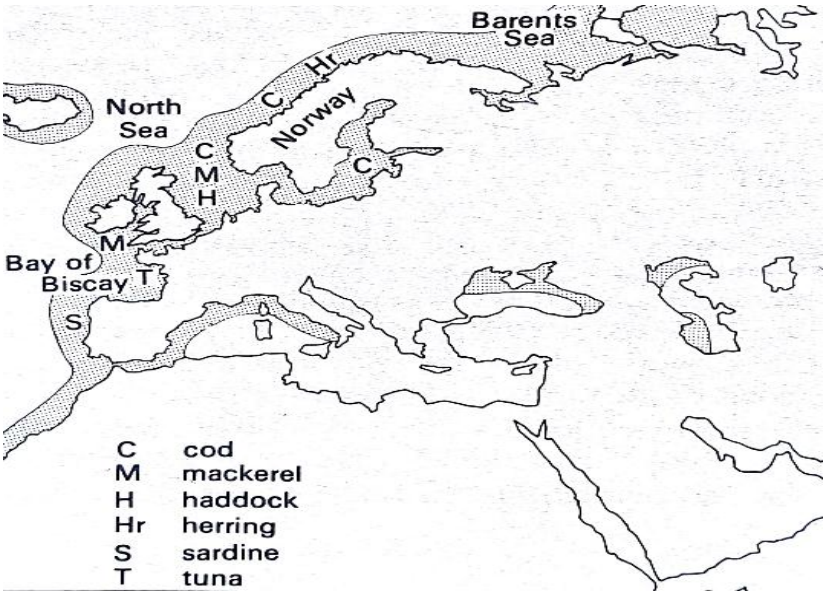
Examples of Fish caught from the North Western Atlantic Fishing Ground

i. Cod (is overfished)
ii. Haddock
iii. Sardines
iv. Halibut
v. Hake
vi. Flounder
vii. Mackerel
viii. Herrings (is overfished)

C. NORTH EAST ATLANTIC (NORTH WEST EUROPE) FISHING GROUND

- It is one of the major fishing grounds of the world.
- Fishing grounds in this area include Barents, sea, Iceland, North Sea and Bay of Biscay.
- The meeting of warm North Atlantic Drift and cold Irminger (East Greenland) makes fishing possible all year round.
- Fishing countries include Iceland, Norway, Denmark, Germany, Spain and Great Britain.
- Norway is the leading fishing nation in this area, (most caught being Cod and Herring).

North East Atlantic (North West Europe) Fishing Ground



REASONS WHY NORWAY IS A LEADING FISHING NATION IN THIS AREA

- Harsh climate makes farming difficult. This force people to go fishing.
- Absence of extensive minerals and forest resources has forced Norway to turn to the sea.

Examples of Fish Caught from the North East Atlantic Fishing Ground

- Mackerel
- Haddock
- Halibut
- Herring
- Plaice
- Sole
- Skate
- Hake

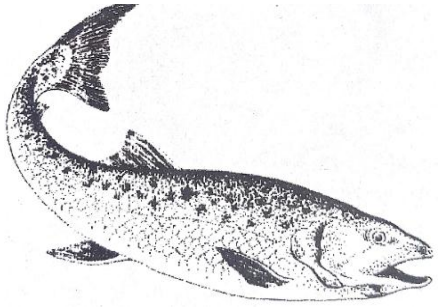
D. NORTH EAST PACIFIC (NORTH WEST AMERICA) FISHING GROUND

- It extends from California to Alaska.

Examples of Fish Caught from the North East Pacific Fishing Ground

i. Halibut
ii. Cod (it is overfished)
iii. Herrings (it is overfished)
iv. Salmon

Salmon Fish



NOTE: Salmon is of great importance here.

- ❖ It is caught from rivers such as Frazer, Columbia, Skeena and Sacramento.
- ❖ They are trapped as they swim upstream to their spawning grounds.
- ❖ Although they live in salty waters, they swim into fresh water to spawn every two years.
- ❖ Huge quantities of tinned salmon are exported to Australia and the United Kingdom.

IMPORTANT POINTS ABOUT SALMON FISH

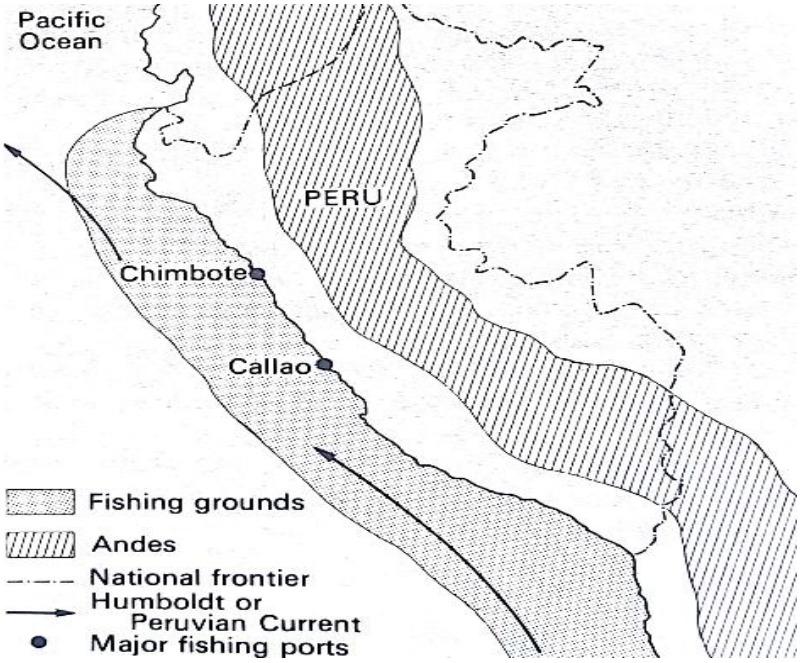
- ➢ Young Salmon fish hatch from eggs laid in mountain streams and lakes.
- ➢ When they are about one year old, young Salmon fish swim downstream to the sea.
- ➢ When they are about two to four years old the Salmon fish return to the rivers to lay their eggs (this is when they are caught.)
- ➢ They are caught by straw and seine nets in coastal waters.

OTHER FISHING GROUNDS

E. PERU FISHING GROUND

- ➢ It is found on the western coast of South America.

Peru Fishing Ground



FACTORS PROMOTING FISHING IN PERU

- The flowing of the cold Peruvian current enables planktons to grow abundantly.
- Presence of Chimbote as the main fishing port.
- Fish caught include: anchovies.

F. SOUTH AFRICA FISHING GROUND

- Fishing here is done on the shallow waters of Agulhas Banks.
- The fishing ports include Port Elizabeth, Port Nolloth and Saldana Bay.

REASON FOR FISHING

- Presence of shallow waters promotes the growth of planktons since photosynthesis is possible because sunlight penetrates. Planktons are food for fish.

Examples of Fish caught from the South African Fishing Ground

i. Cape hake

ii. Cape Anchovy

iii. South African Pilchards

G. BRAZIL, MOROCCO AND INDIAN FISHING GROUNDS

- These are not fully utilized.

FACTORS INFLUENCING THE DEVELOPMENT OF THE FISHING INDUSTRY

1) HUMAN FACTORS

- Presence of a large population which provides labour and markets for fish.
- Presence of skilled personnel since the fishing industry is becoming more mechanized.

2) PHYSICAL FACTORS

i. The meeting of warm and cold ocean currents which promotes the growth of planktons on which fish feed.

ii. Presence of good natural habours.

iii. Being warm blooded animals, fish favour in temperatures lower than 20^0C.

iv. Availability of planktons on which fish feed.

v. Availability of shallow waters which promotes the growth of planktons.

TYPES OF FISHING

a) Onshore fishing

- This is done along the coastal waters, stretching to only 70 kilometres from the shore. Small fishing vessels are used, which only stay at the sea for about a day or two.

b) Offshore fishing

- This is done beyond the 70 kilometres limit into the sea.
- Larger fishing vessels are used that are well refrigerated, making them to stay at the sea for several weeks without the fish going bad.

MAIN METHODS OF FISHING

i. Trawl nets

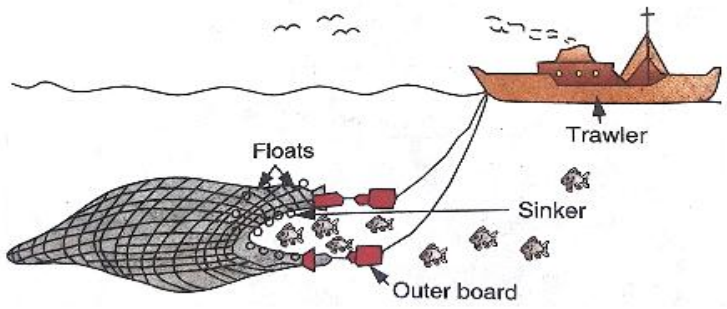
ii. Drift nets

iii. Seine nets

I. TRAWL NETS

- This type of net has a conical shape which is open at the base.
- The mouth is kept wide open by a system of floats on the top part and weights at the bottom.
- The fish is caught by dragging the net along the sea bed by trawlers.
- These nets are used to catch ***demersal fish***.

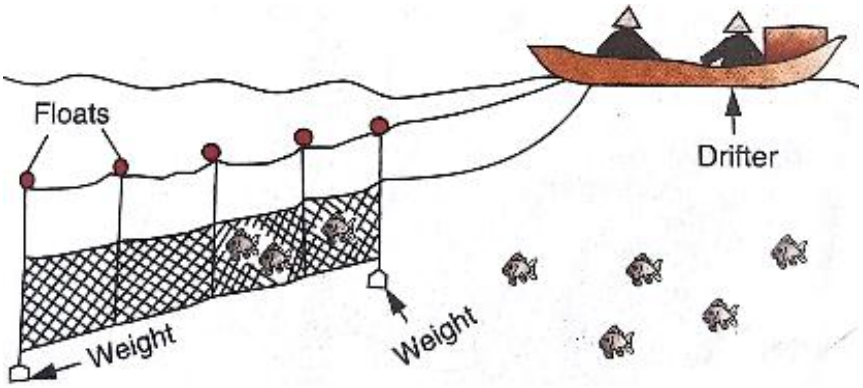
A Trawl Net



II. DRIFT NETS

- These nets are hanged vertically in the water because they are weighted along the bottom edge and supported along the top edge by floats.
- Fish are caught by their gills in the mesh of the nets as they try to swim across.
- These nets are used to catch ***pelagic fish***.

Drift Net



III. SEINE NETS

- There are two types of Seine nets, these are: **Pulse Seine** nets and **Haul Seine netting**.

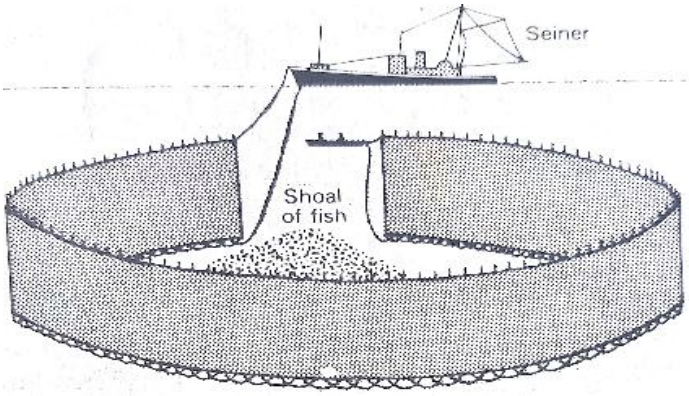
i. Pulse Seine Nets

- These nets are pulled by their ends to surround a shoal (where fish are in large numbers) of fish. These nets are stretched between two fishing boats. As the net fills with fish, ships move close together to enclose the fish.

❖ Sometimes they are pulled by two fishermen with one end attached to a small boat.

These are similar to drift nets, and are used to catch **pelagic fish**.

Pulse Seine net

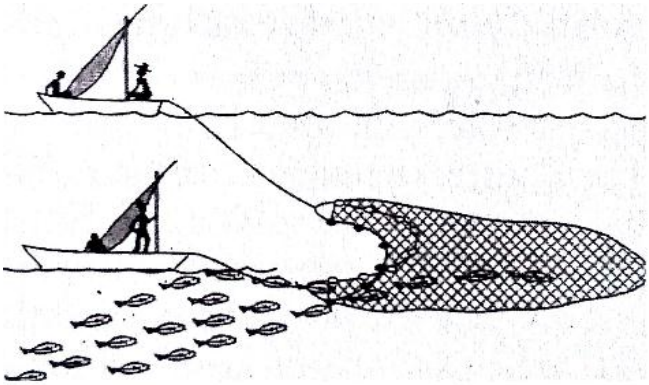


ii. Haul Seine Netting

- These are nets having an oval mouth with a conical shape. These nets are stretched between two fishing boats. As the net fills with fish, the boats move close together to enclose the fish.

➢ They are used for catching **demersal fish**.

Haul Seine Net



OTHER FISHING METHODS

① Fish traps

✓ These use weaved baskets containing baits inside. The traps are lowered into the shallow coastal waters and left for one or two days before they are hauled up. Supporting poles are used where water moves at high speed.

② Lining

✓ This is mainly used where the sea bed is rugged and likely to damage the nets. The lines may carry hundreds of baited hooks, and may be up to two kilometres long trailed by fishing vessels.

③ Harpooning

✓ This method is used to catch large fish that swim near to the surface. The fishermen fire (with a gun) barbed spears (harpoons), attached to the fishing vessel by a line. When the

harpoon is fired into the target, the barbed points become firmly anchored into its flesh, enabling the people to drag the fish to the ship.

IMPORTANCE OF THE FISHING INDUSTRY

1) Source of raw materials for many products such as fertilizer, fish-meals, glue and oil.
2) Fish are a source of proteins and minerals such as iron, calcium, iodine, copper, etc., and vitamins.
3) Fish attract tourists that bring foreign exchange.
4) Source of employment in the fisheries sector. For example, at **MALDECO FISHERIES**.
5) Foreign exchange earnings after exporting the fish.

REASON WHY THE FISHING INDUSTRY IS ALSO CALLED THE ***"ROBBER INDUSTRY"***

- The rate at which the fish are caught does not balance with the rate at which they replace themselves (through breeding).

OR

- More fish are caught than the rate at which they replace themselves through breeding.

☞This problem has been worsened by rapid population growth, which increases demand for fish.

PROBLEMS (CHALLENGES) FACED BY THE FISHING INDUSTRY

1) Water pollution

- This results from industrial wastes discharged into rivers and lakes.
- Oil leakages into lakes, rivers and oceans when pipes and tankers break. These lead to suffocation and death of fish.

2) Over Fishing and Fishing Piracy

- Rapid population growth has increased the demand for fish, and also people turn to fishing as an alternative source of income.
- Fishing piracy is the illegal fishing of endangered species (such as whales).

3) Destruction of the Fishing Grounds

- This problem comes in because most fishing grounds are also used for other purposes, such as recreational activities and sporting activities.

4) Lack of Fish Management Skills

- Many people do not know how to manage and conserve fish. As a result, a lot of fish go bad and wasted.

5) Indiscriminate Fishing

- This is the catching of immature fish because fishermen use nets with small mesh.
- Fish are also caught during their breeding seasons.

6) Deforestation

- Loss of forest cover has increased the rate at which soil erosion takes place and the subsequent siltation of water bodies, and the degradation of fishing grounds.

7) Climate Change

- Rising global temperatures have disturbed the normal patterns of ocean currents and the upwelling of cold water that supply nutrients to the surface waters.
- It also promotes the drying up of fresh water sources due to decreased rainfall. All these have resulted in the shrinking of the fishing grounds.

POSSIBLE SOLUTIONS TO THE PROBLEMS FACING THE FISHING INDUSTRY

- ❖ Restocking over-fished waters.
- ❖ Awareness campaigns (civic education) to sensitize people on the bad effects of misusing fish resources.
- ❖ Use of nets with big mesh when catching fish to allow young fish grow.
- ❖ Enactment and enforcement of laws that protect water bodies from pollution.
- ❖ Relocating the fish from highly populated areas to over-fished waters.
- ❖ Removal of all poisonous and harmful chemicals from industrial waste before it is discharged into the rivers and seas.
- ❖ Imposing tough measures on those that catch small fish by fining them.
- ❖ Fish farming to reduce the increasing demand of fish from natural lakes and rivers.
- ❖ Having a closed season to allow fish breed. A closed season is when fishing on the major lakes, oceans and rivers is suspended during some months of the year.
- ❖ Enforcement of international law conventions to protect fish in fishing grounds.

OTHER RESOURCES FROM THE SEA

i. Whales

- These can be used to make soap, margarines and lubricants (from oil or blubber), fertilizers (from bones and flesh), vitamin extracts (from its liver), cold cream and cosmetics (from sperm oil (wax)) and as a source of food in Japan.

ii. Salts

iii. Oil

- From dead marine plants and animals.

iv. Natural Gas

- From dead marine plants and animals.

v. Fresh water

- Through desalination.

vi. Minerals

- Such as potassium, magnesium, sulphur, sodium chloride, phosphorous, etc.

vii. Sea weed

- This is used as a raw material for making ice cream, malted milk, cheese, chocolate milk, salad dressing, jellies, puddings, etc.

viii. Metals

- Such as iron, gold, tin, manganese and gold.

ix. Food

- From prawns and shells.

x. Sand and gravel

- Brought by erosion.

xi. Seals

- Their fur and pelts are used for making saddles for motor cycles.
- Their insulin from the liver is used for treating diabetes.

FISHING IN MALAWI

- The main fishing grounds in Malawi are: Lake Malawi (SW arm and SE arm of southern end, around Nkhotakota, Nkhatabay, Likoma), Lake Malombe, Lake Chirwa, Lake Chiuta, Shire River, Ruo River, Elephant Marsh, etc.

METHODS OF FISHING IN MALAWI

i. Trawl nets
ii. Baskets or hand-nets
iii. Fishing lines
iv. Gill nets
v. Seine nets
vi. Draw nets
vii. Traps.

SPECIES OF FISH CAUGHT IN MALAWI

i. Tilapia
ii. Ntchila
iii. Chambo
iv. Utaka
v. Mpasa
vi. Sanjika
vii. Kampango
viii. Mlamba
ix. Matemba
x. Mcheni

PROBLEMS FACED BY THE FISHING INDUSTRY IN MALAWI AND THEIR SOLUTIONS

i. Overfishing

- Fish are an important source of income and food (proteins).
- Rapid population growth has increased the demand for fish, leading to overfishing and extinction of some species.

SOLUTIONS

- The Fisheries Act has regulated the size of mesh for nets for fishing. Large mesh allows young fish to grow.
- Observing the closed fishing season to allow fish spawn (breed), and build stocks. This is done with the help from the Village Beach Committees set up by the Government of Malawi.
- The government is using the quota system to control the amount of fish caught by each fishery.
- Civic education to the fishermen on the problems of overfishing.

ii. Water pollution

- This is done by some fishermen who use poisonous chemicals and herbs, such as ***katupe*** when fishing. These kill aquatic animals.
- Industries also dump their wastes in water bodies.

SOLUTION

- Civic education to fishermen and industries to stop using poisonous herbs and dumping industrial wastes respectively in water masses.

iii. Water Hyacinth (Namasipuni)

- These are plants that use oxygen which would have been used by fish for respiration and can make fish die.

SOLUTION

- Removal of all water hyacinth (Namasipuni) from fishing grounds.

TOPIC 6: NATURAL RESOURCES

- These are things that are provided by nature. They include; vegetation, air, minerals, fossil fuels etc.

TYPES OF NATURAL RESOURCES

i. Renewable Resources

- These are resources which can replenish (replaced) themselves when used up.

Examples of renewable resources

- Air/wind
- Water

ii. Non-Renewable Resources

- These are resources which do not replace themselves when used up.

Examples of non-renewable resource

☞Oil
☞Coal
☞Natural gas
☞Coal
☞Nuclear

ENERGY

- It is the ability to do work.

IMPORTANCE OF ENERGY IN DEVELOPMENT

i. It is used for operating machinery in factories.
ii. It is used for transportation.
iii. It is used for lighting, heating and cooling in homes, offices, factories, etc.
iv. It promotes trade within and across countries through efficiencies in transportation.
v. It raises the living standards of people when using it for entertainment, lighting, cooking, heating, etc.

TYPES OF ENERGY

i. Hydro-electric power
ii. Wind
iii. Solar
iv. Biogas
v. Nuclear
vi. Geo-thermal
vii. Thermal

A. HYDRO-ELECTRIC POWER (H.E.P.)

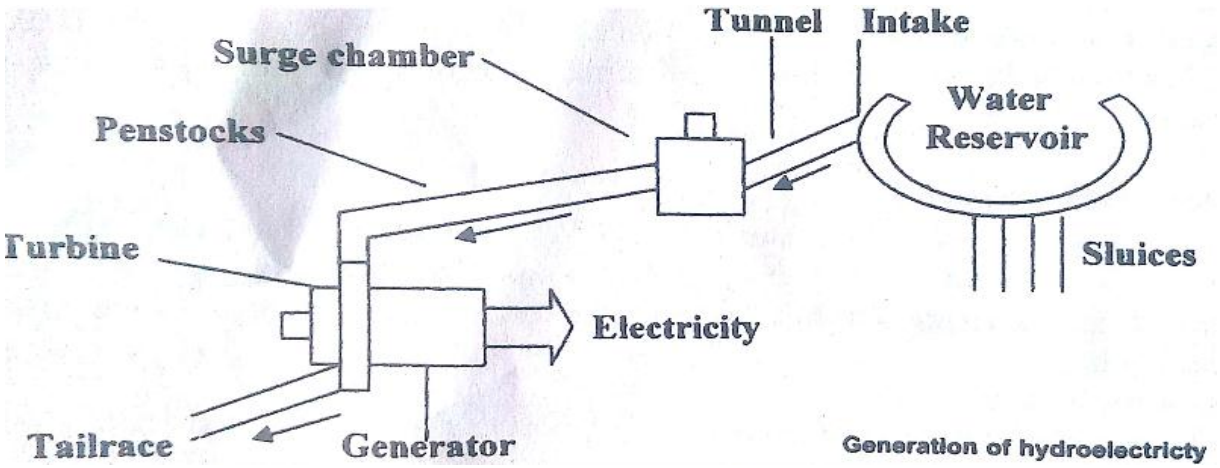
PRODUCTION OF HYDRO-ELECTRIC POWER

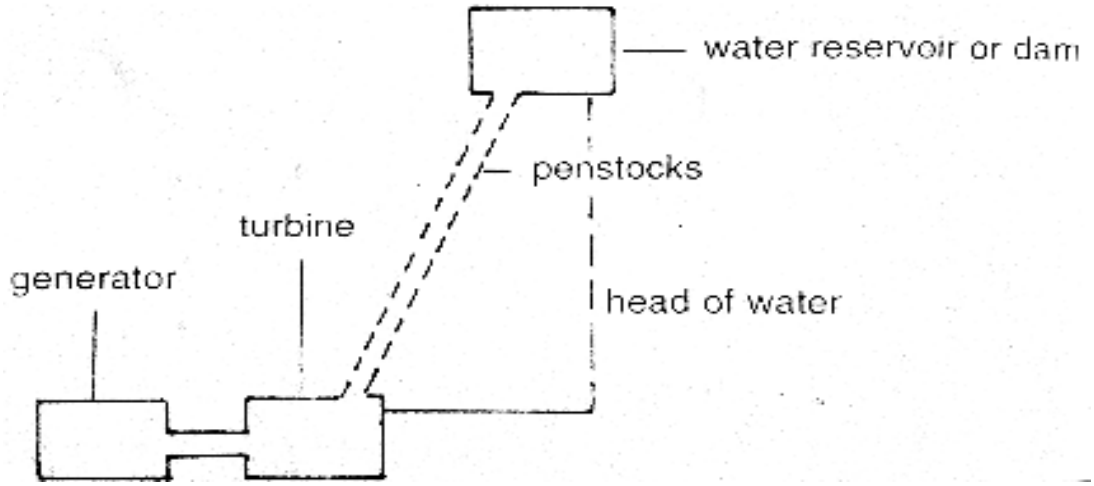
Water is stored in a reservoir, such as a dam. Penstocks lead this water from the reservoir on a steep slope to the turbines that are placed on the lower end of the station. The water makes the turbines to rotate; this makes generators to produce electricity.

- The water is then led back to the river by the tailrace.

☞ The voltage produced is increased by step-up transformers.
☞ The steep slopes create natural falls where a constant volume of water moves with fast speed.

Production of Hydro-electric Power





FACTORS THAT AFFECT THE PRODUCTION OF HYDRO-ELECTRIC POWER

1) PHYSICAL FACTORS

- A large natural head of water falling rapidly from a steep slope. Where these are not available, dams are built for the same purpose.
- Adequate precipitation which is evenly distributed throughout the year.
- Constant and uniform supply of water from rivers or lakes that do not fluctuate.
- Impermeable rocks to permit maximum surface drainage.
- Enough space for the construction of a reservoir.

2) HUMAN FACTORS

- Skilled personnel to set up and manage the station.
- A large market for electricity.

3) ECONOMIC FACTORS

- Heavy capital outlay for setting up and maintaining the station.
- A large market for electricity.

ADVANTAGES OF HYDRO-ELECTRIC POWER

- It is sustainable because it uses water which is renewable.
- It is a relatively cheap form of electricity.
- It causes limited pollution.
- The construction of dams reduces the risk of flooding and water shortages.
- It is efficient and reliable.

DISADVANTAGES OF HYDRO-ELECTRIC POWER

- It is expensive to set up.
- Construction of dams promotes water-borne diseases.
- It cannot be stored.
- When dams break, flooding occurs.
- Dams destroy habitats for wildlife.
- It leads to relocation of people and animals since large areas of farmland and wildlife habitats are flooded.

- When the area is flooded, decaying vegetation release methane and carbon dioxide which are greenhouse gases responsible for global warming.

HYDRO-ELECTRIC POWER IN AFRICA

- Africa has a great potential to produce hydro-electric power. However, it produces only 3% of the world's energy production.

REASONS WHY AFRICA HAS GREAT POTENTIAL TO PRODUCE HYDRO-ELECTRIC POWER

- Many parts, especially the equatorial region receives a lot of rainfall throughout the year.
- Availability of big, reliable rivers such as Zambezi, Zaire, Nile, etc. These have steep gradients, giving rise to waterfalls ideal for the production of hydro-electric power.

REASONS FOR AFRICA'S FAILURE TO PRODUCE ENOUGH HYDRO-ELECTRIC POWER

- Inadequate capital outlay for setting up and managing stations.
- Inadequate market since most countries are developing, and lack well-developed industries.
- Most countries are not willing to destroy their beautiful rivers which attract tourists.
- Lack of technical knowledge and personnel to set up and manage the system.
- Presence of alternative energy sources such as petroleum in some countries.
- Some rivers are seasonal, with fluctuating water levels.
- Dense forests in some parts of Africa make many rivers not accessible to set up the hydro-electric power scheme.
- Political differences which prevent countries from doing joint projects to develop shared water resources into hydro-electric power schemes.

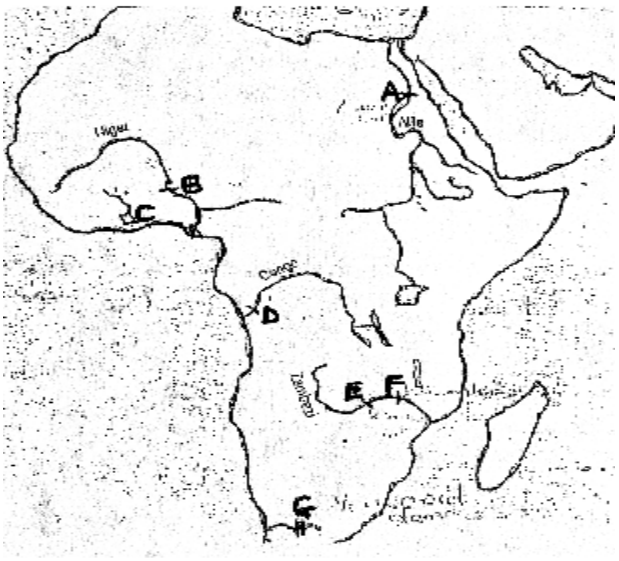
MULTI-PURPOSE RIVER DAMS

- These are big dams constructed across big rivers to provide a steep gradient in the absence of waterfalls.
- They are called multi-purpose because apart from generation of hydro-electricity, the dams have many other good purposes.

EXAMPLES OF MULTI-PURPOSE RIVER DAMS IN AFRICA

i. Kabora Bassa dam along Zambezi River (Mozambique)
ii. Kariba dam along Zambezi River (Zambia)
iii. Volta (Akomboso) dam along Volta River in (Ghana)
iv. Inga dam on Zaire River (DRC)
v. Owen falls (Uganda)
vi. Kainji dam along Niger River (Nigeria)
vii. Aswan dam which forms Lake Nasser along Nile River (Egypt)
viii. Verwoerd dam along Orange River

Multi-purpose River Dams in Africa



A: Aswan high dam on Nile River
B: Kainji dam on Niger River

C: Volta (Akomboso) on Volta River

D: Inga dam on Zaire River

E: Kariba dam on Zambezi River

F: Kabora Bassa dam (Zambezi River)

G: Verwoerd dam on Orange River

IMPORTANCE OF MULTI-PURPOSE RIVER DAMS

i. Production of hydro-electric power
ii. Water is used for irrigation
iii. For recreation
iv. For fishing (fish farming)
v. For domestic purposes

PROBLEMS OF MULTI-PURPOSE RIVER DAMS

i. Creation of dams in rivers endangers the habitat of wildlife.
ii. They provide breeding grounds for diseases.
iii. It leads to relocation of people.
iv. There is high risk of flooding when dams break.

WIND ENERGY

- It is ideal for small-scale generation.

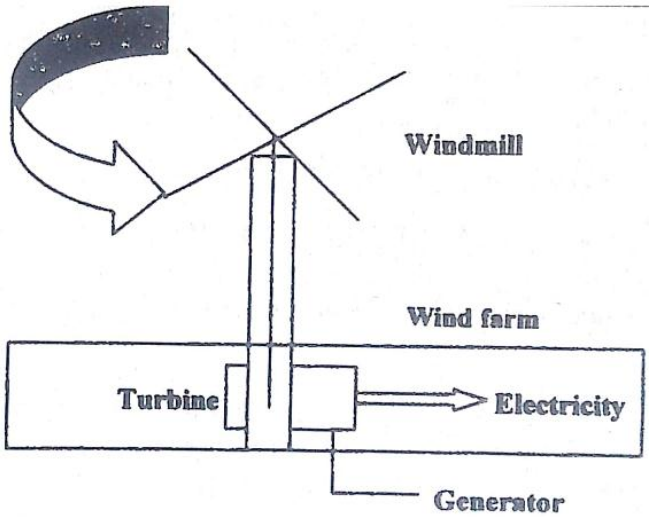
CONDITIONS NECESSARY FOR THE PRODUCTION OF WIND ENERGY

- An exposed site to wind such as hilltop.
- Flat land.
- Strong and reliable winds.

PRODUCTION OF WIND ENERGY

Several windmills are connected and joined to turbines. When the wind blows, the turbines rotate. The rotation of the turbines makes generators connected to them to produce electricity.

Production of Wind Energy



ADVANTAGES OF WIND ENERGY

i. It is safe since it does not give off radio-active emissions.
ii. It is clean since it does not release greenhouse gases.
iii. It has minimal effects on local ecosystem.
iv. Its production is relatively cheap.
v. It is sustainable since wind is renewable.
vi. There is no air, water and land pollution.
vii. There are no finite resources involved.
viii. Source of income to farmers using them since work can be done even at night. This increases production.

DISADVATAGES OF WIND ENERGY

i. It is not reliable since wind does not blow all the time.
ii. It cannot be stored during storms for use during calm periods.
iii. It is very expensive to set up and maintain.
iv. It is not efficient.
v. It causes visual pollution.
vi. Rotation of propellers and turbines may kill wild animals such as birds.
vii. Wind mills are noisy and can interrupt radio and television reception for nearby people.

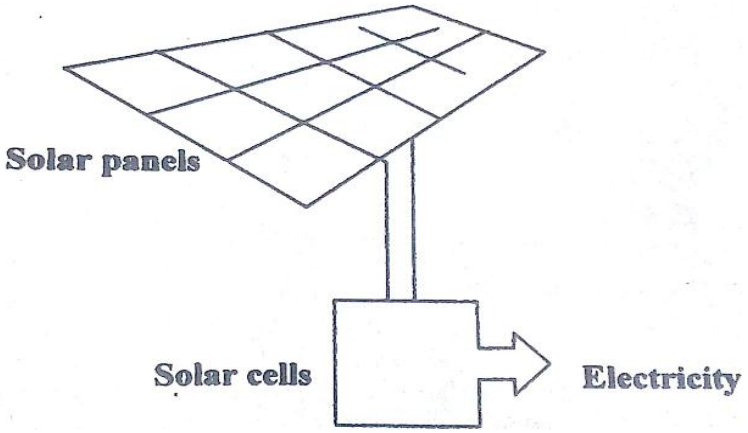
B. SOLAR ENERGY

This type of energy is derived from the sun.

PRODUCTION OF SOLAR ENERGY

This type of energy is produced through solar panels or cells, absorber pipes and mirrors. These absorb energy from the sun which is later converted to electricity by inverters.

Production of Solar Energy



ADVANTAGES OF SOLAR ENERGY

- It is ideal (suitable) for small-scale production.
- It is a clean form of energy since it does not cause pollution.
- It is relatively cheap for household purposes.
- There is unlimited supply.
- It can be stored.

DISADVANTAGES OF SOLAR ENERGY

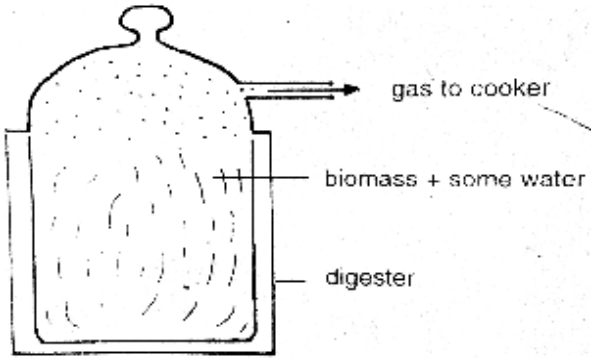
- It is affected by clouds, seasons or darkness.
- It is not always possible when demand exists.
- It expensive to buy panels, batteries, inverters and to install.
- Limited supply since solar panels convert only 30% of solar energy to electricity.

C. BIOGAS (BIOMASS)

PRODUCTION OF BIOGAS

This type of energy uses biomass such as wood, dung and grass. These materials are put in digesters where bacteria act on them to be fermented. Fermentation releases methane gas which is burned and can be used for heating, cooking, etc.

Production of Biogas



ADVANTAGES OF BIOGAS ENERGY

- It is relatively cheap.

- It is renewable.
- Raw materials are obtained easily. For example dung.
- It is one way of disposing large quantities of wastes, such as cow dung.

DISADVANTAGES OF BIOGAS

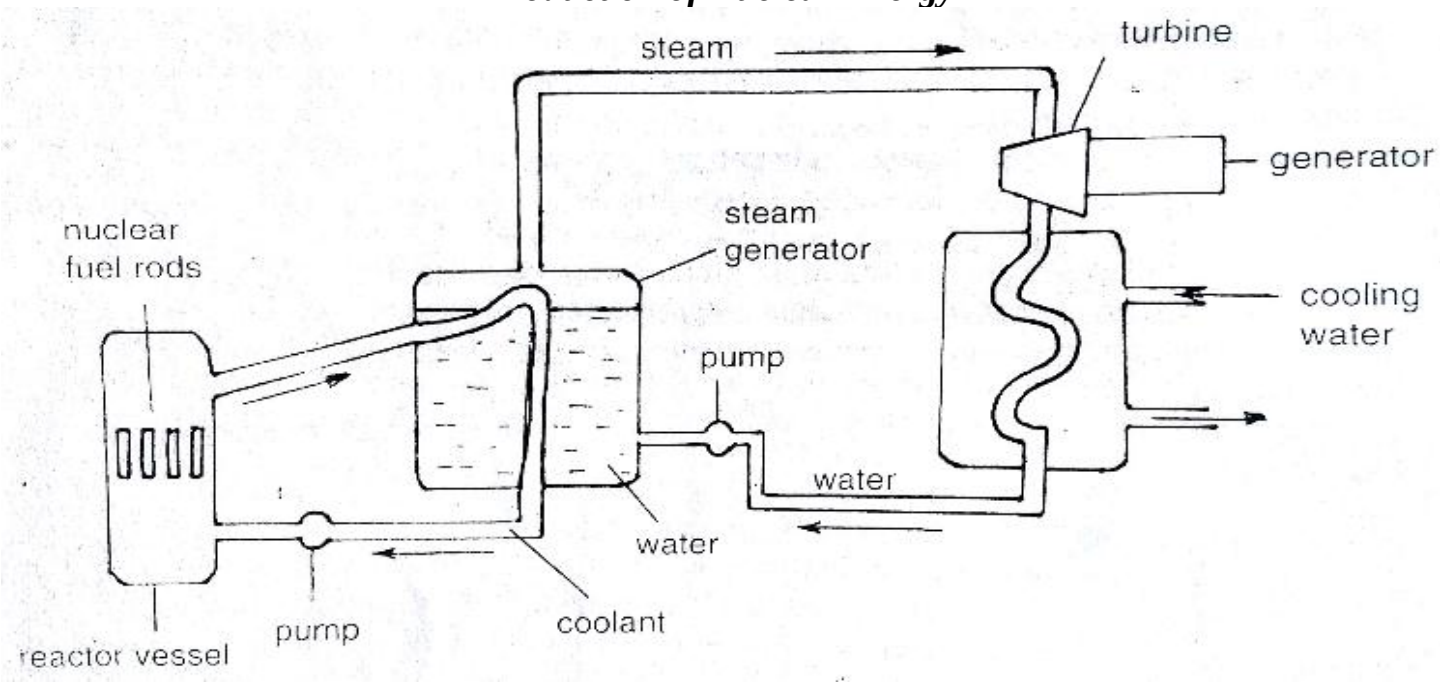
- The release of methane gas causes global warming.
- Farmers are forced to buy fertilizer for farming since dung can no longer be used as manure on farms.
- It requires a lot of wastes from the environment. This may cause ecological imbalances.
- The use of firewood and charcoal promotes deforestation.
- It cannot provide a constant supply of energy since the materials for its production are not always available in the environment.

D. NUCLEAR ENERGY

PRODUCTION OF NUCLEAR ENERGY

This energy is produced from splitting of nuclei of radio-active materials, such as uranium in a nuclear reactor. This is done by bombarding (intense stream of high-energy particles) the nuclei with several neutrons. This process is called **fission**. When this happens, great heat is produced which heats up water in the steam generator, where steam is produced. The steam is then directed to turbines, making them to rotate. The rotation of turbines makes generators connected to them to produce electricity.

Production of Nuclear Energy



ADVANTAGES OF NUCLEAR ENERGY

- It requires limited raw materials to be produced.
- Nuclear waste is limited and can be stored underground.
- There are limited risks of accidents since there are several safeguards.
- It causes little pollution.

DISADVANTAGES OF NUCLEAR ENERGY

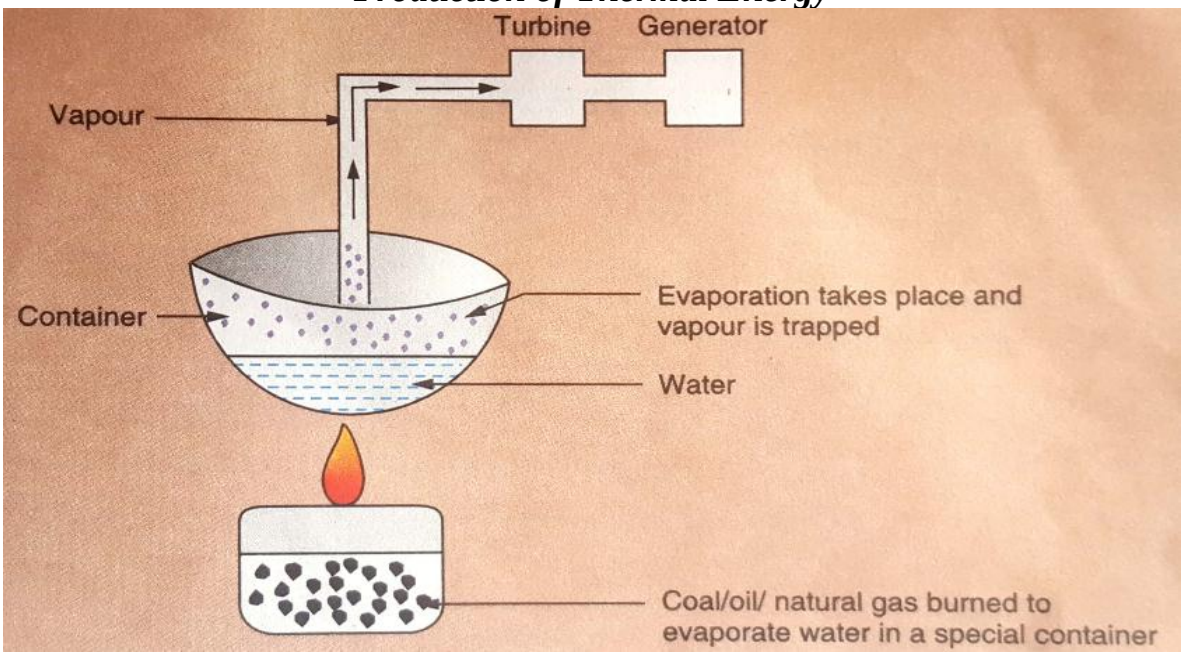
- It is not safe because the wastes can remain radio-active for many years. These may cause cancer and many other health problems.
- It leads to accidents that have devastating effects.
- It is very expensive.
- There is limited demand since there are many other alternative energy sources.
- High cost of shutting down old power stations.

E. THERMAL ENERGY

PRODUCTION OF THERMAL ENERGY

This power is produced by burning fossil fuels such as coal or natural gas. When these are burned, heat is produced which is used to heat water in special containers. From the heated water steam is produced, which is trapped and directed to turbines, making them to rotate. The rotation of the turbines makes generators connected to them to produce electricity.

Production of Thermal Energy



ADVANTAGES OF THERMAL ENERGY

i. It is safer than nuclear energy.
ii. Oil and gas are more efficient to burn, easier to transport and distribute.
iii. Initial costs are cheaper as they are erected in more accessible positions.
iv. The energy sources can be stored such as coal, oil, etc.

DISADVANTAGES OF THERMAL ENERGY

i. The burning of fossil fuels produces a lot of greenhouse gases which cause global warming and acid rain.
ii. Destruction of the environment, for example, during deep mining of coal.
iii. The most easily accessible deposits have been exhausted.
iv. Increased production costs are involved.
v. Labour costs are high since fossil fuels are bulky to move from one place to the other.
vi. Thermal plants produce limited outputs.

F. GEO-THERMAL ENERGY

- Geo-thermal means "heat from the earth". This heat originates from either magma or rocks beneath the earth's surface.

PRODUCTION OF GEO-THERMAL ENERGY

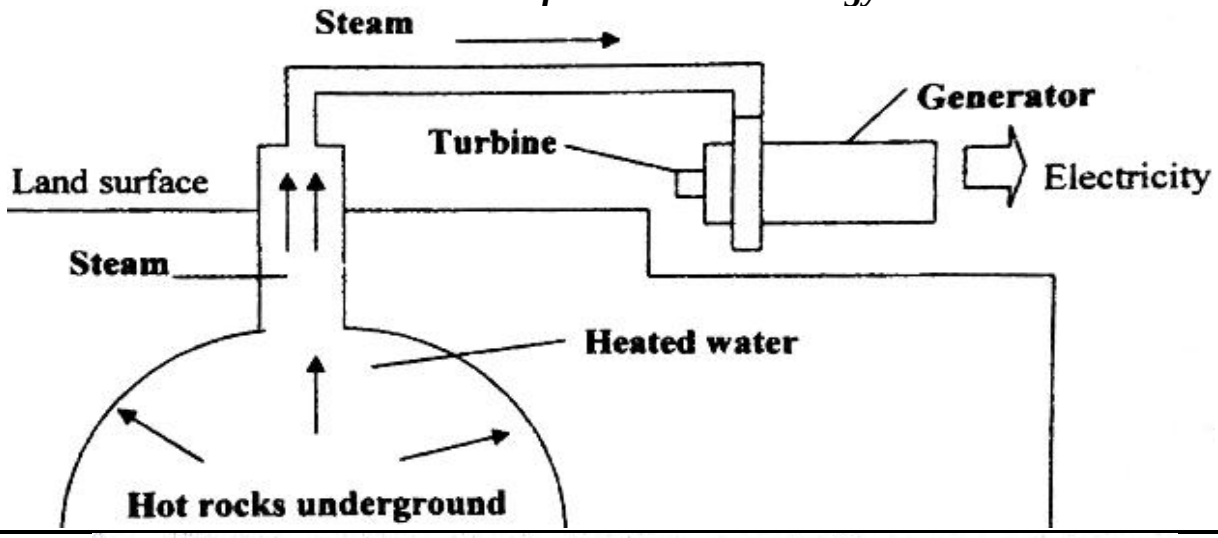
When rail falls, it infiltrates the soil through cracks. This water comes into contact with the heated rocks where it is heated to produce steam. Sometimes heat from magma can warm water present inside the earth. This water may then be ejected to the earth's surface either as hot spring or geyser. Hot springs may be used for heating in homes and offices, and geysers produce steam which is trapped and directed to turbines which are connected to generators to produce electricity.

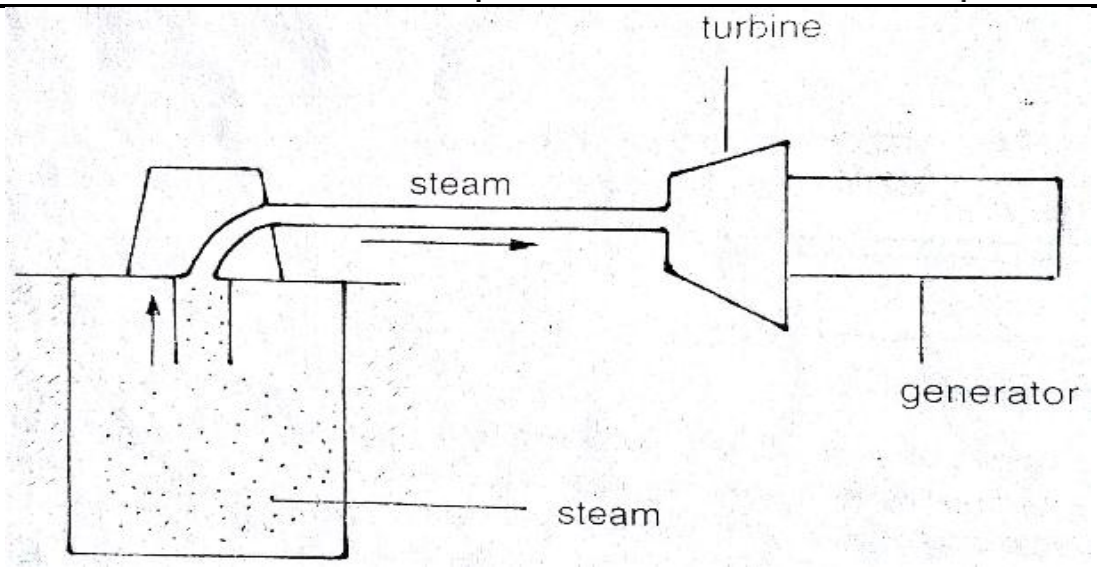
NOTE: A hot spring is superheated water that is ejected slowly while a geyser refers to both superheated water and gases that is ejected explosively.

Countries that produce geo-thermal energy

- *New Zealand, Iceland, Central America, Italy, Former USSR, USA and Japan.*
- ✓ These countries are located within the volcanic belts and have heated rocks which exist close to the earth's surface.

Production of Geo-thermal Energy





ADVANTAGES OF GEO-THERMAL ENERGY

- It is suitable since it is renewable.
- It does not cause pollution of air, water or land.
- It is freely available.
- It is a reliable source of energy.

DISADVANTAGES OF GEO-THERMAL ENERGY

- High cost of construction and maintenance.
- High risk of volcanic eruptions and earthquakes in stations.
- Emission of sulfur into the atmosphere.
- Its production is limited only to areas with hot rocks present near the earth's surface.

THE ENERGY CRISIS

- It refers to a situation where energy becomes scarce to the majority of people in a particular country.

- **Over the recent years, the demand for natural resources and energy has increased sharply due to:**

a) Rapid population growth that increases demand and pressure on energy sources.
b) Economic development in many countries, such as development of industries.
c) Increasing wealth of people that requires energy for heating, lighting, cooking, etc.
d) Increasing technological advances, such as in transport and farming.

CAUSES OF ENERGY CRISIS IN MALAWI

- Siltation of water bodies. This reduces the water holding capacity of water bodies, making them fail to produce enough electricity.
- Frequency of droughts. This makes water bodies not hold enough water for the generation of hydro-electric power.
- Increased floods. These lead to the destruction of power-generating plants. Floods also promote the siltation of water bodies.
- Aquatic weeds. These block the power-generating plants, making them fail to produce enough hydro-electric power.
- Vandalism of power-generating plants, such as transformers.
- Lack of technology and investment in energy generation.
- Withholding of funding by donors. This results in a shortage of foreign exchange in the country to import enough fuel.

- **Only few people use electricity due to the following reasons.**
  - Electricity coverage is not enough to cater for all the demand.
  - Electricity rates are very high, making electricity in Malawi not to be affordable.

✓ This problem has been worsened by rapid population growth that promotes deforestation, leading to siltation of water reservoirs which in turn interrupts hydro-electric power generation. As a result, there is higher demand for electricity than the supply of electricity.
✓ This leads to energy crisis in Malawi.

IN THE WORLD

▪ **The energy crisis emanates from the following:**

a) The reserves for non-renewable fossil fuels are being depleted at a fast rate.
b) Fossil fuels are also becoming expensive because the demand is higher than their supply.
c) Oil and natural gas remain limited, and will be depleted shortly, and become scarce.

POSSIBLE SOLUTIONS TO ENERGY CRISIS

i. Using alternative renewable sources of energy such as wind energy and solar energy.
ii. Afforestation and re-afforestation in developing countries.
iii. Conservation of energy in use.
iv. Improving the efficiency of energy production, transportation and use.

POSITIVE EFFECTS OF ENERGY CRISIS IN THE WORLD

i. Countries are encouraged to exploit and develop new fields.
ii. Countries are encouraged to control the use and conservation of available energy resources
iii. It brings foreign exchange to countries that export the energy. For example, Mozambique earns a lot of foreign exchange by exporting hydro-electric power to South Africa.

NEGATIVE EFFECTS OF ENERGY CRISIS IN THE WORLD

☞It increases the production costs in other industries.
☞It leads to an increase in the prices of imports and other locally manufactured goods.
☞It lowers the Gross Domestic Product (GDP) of developing countries.
☞It causes recession, making countries unable to create many jobs.
☞Developing nations spend a lot of money on importation of crude oil.
☞It creates negative balance of trade since the money realized after exporting will be less than the money lost through imports.
☞Increased crime rates.
☞Increased damage to the environment.
☞Industrial strikes due to persistent blackouts.
☞Loss of jobs as businesses close down.

MINERALS

MINERAL

▪ A mineral is a chemical compound which occurs in the earth's crust and which forms the basis of rocks.

AN ORE

▪ It is a rock which has a high metallic content to make it worth mining.

METAL

▪ It is a chemical element which can be separated from mineral by a special treatment.

ALUMINIUM

❖ It is a metal commonly found in bauxite.

OTHER ORES FROM WHICH ALUMINIUM CAN BE EXTRACTED (APART FROM BAUXITE)

- ☞ Mica
- ☞ Feldspar
- ☞ Kaolin
- ☞ Corundum
- ☞ Cryolite

TYPES OF MINERALS (WAYS IN WHICH MINERALS OCCUR)

a) Organic minerals

✓ These can be used to provide power. Examples include coal, petroleum, etc.

b) Metallic minerals. There are two groups under this one, which are:

i. Non-ferrous metallic minerals

✓ These contain metals.

Examples of non-ferrous metallic minerals

- Tin
- Aluminium
- Copper
- Manganese

ii. Ferrous minerals

- Coal
- Oil
- Copper
- Iron ore

✓ These minerals contain iron.

Examples of ferrous minerals

- ☞ Nickel
- ☞ Platinum
- ☞ Iron
- ☞ Chromite

c) Non-metallic minerals.

✓ These do not contain metals.

Examples of non-metallic minerals

- ➢ Asbestos
- ➢ Sulphur
- ➢ Phosphate
- ➢ Salt

SOME COMMON MINERALS

- Bauxite
- Gold
- Diamonds
- Uranium

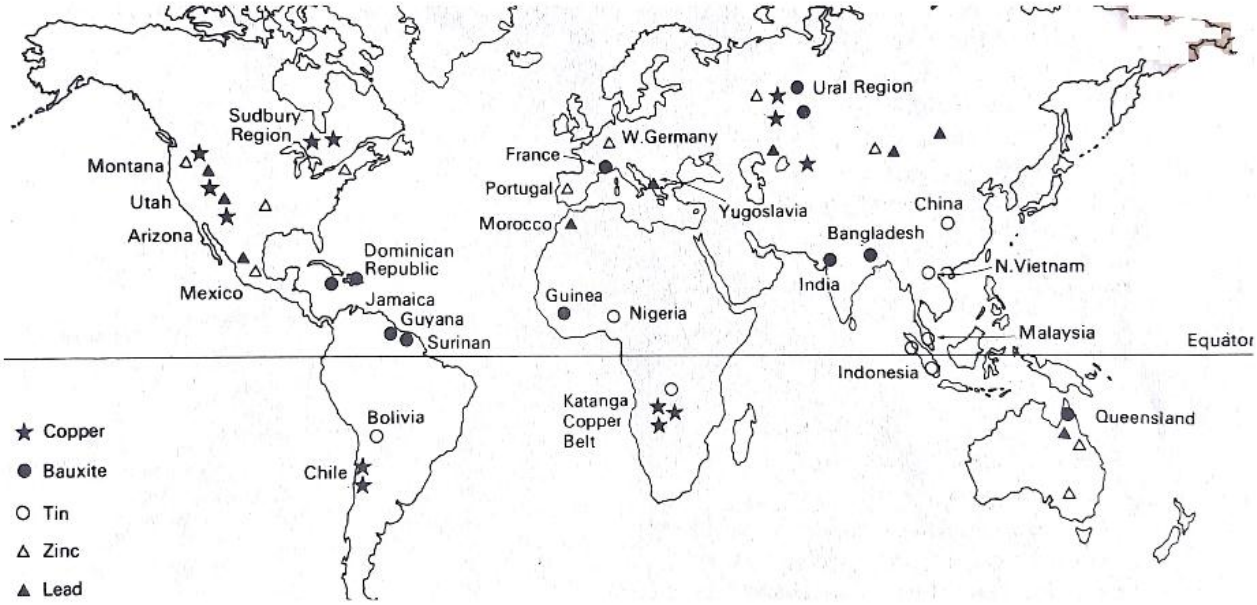
CHARACTERISTICS OF MINERALS

- ✍ *They occur naturally.*
- ✍ *They are inorganic.* These are not alive and were never alive. This means that coal is not a mineral.
- ✍ *They are solid.*
- ✍ *They have an orderly (regular, repeating) internal structure*. This means that glass is not a mineral since it does not have a regular internal structure.
- ✍ *They have a chemical composition.*

NOTE: From the above characteristics, it means that petroleum is not a mineral because of the following reasons:

- ➢ It is made from plants.
- ➢ It is liquid.
- ➢ It consists of many different chemicals.

Distribution of Minerals in the World



FORMATION OF MINERALS (MINERAL PRODUCTION)

Ores are formed in many ways, some of them are:

1) **Magmatic Processes (crystallisation)**
2) **Solution Processes**
3) **Sedimentation of weathered rock materials**
4) **Metamorphic processes**

MAGMATIC PROCESSES

- When magma cools or crystallizes, the heavier minerals in it sink and accumulate at the bottom of the liquid rock in the magma chamber, and become concentrated into ores.

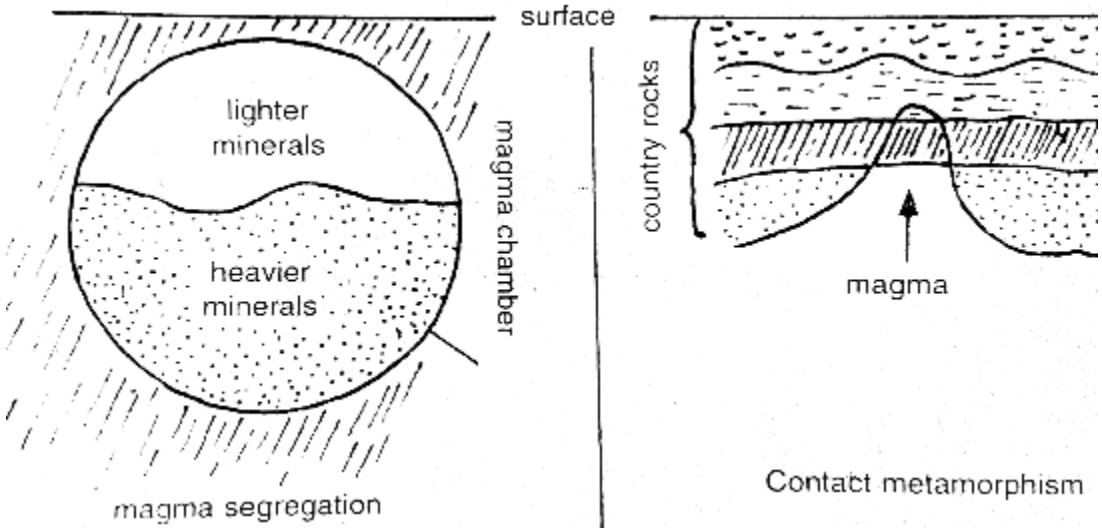
Examples of minerals formed in this way

- Magnetite, chromite and ores of nickel.
- In addition, escaping magma and the highly active chemical solutions it contains change the surrounding rocks (country rocks). In this way, ore minerals are introduced into the country rocks in exchange for existing components in the rocks.

Examples of minerals formed in this way

- Iron ore consisting of haematite and ores of copper such as malachite and bornite; and lead and zinc.

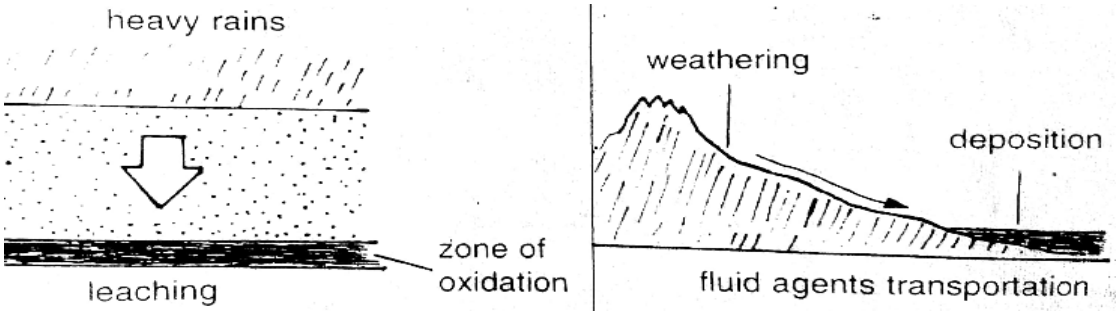
Magmatic Processes



SOLUTION PROCESSES

- When solutions move down the layers of soils they wash minerals down with them. These minerals are accumulated in the zone of oxidation or subsoil where they are concentrated and form ores.
- If this is done in warm and wet areas such as the tropics, ***bauxite*** and ***limonite*** is formed.
- In addition to that, weathered insoluble minerals are carried down the valley with sand and gravel materials.
- On the flood plains, the minerals are concentrated in layers to become placer or alluvial deposits. Minerals formed in this way include ***diamonds***, ***tin***, ***gold*** and ***platinum***.

Solution Processes



SEDIMENTATION NOF WEATHERED ROCK MATERIALS

❖ Weathered rock materials may contain insoluble mineral elements which may accumulate over time in alluvial deposits in flood plains or ocean floors, forming an ore.

METAMORPHIC PROCESSES

❖ This is formed due to high pressure and temperature which are applied on a rock. The minerals in it become more mobile, forming new combinations in the process, which leads to mineral formation.

PPROPERTIES AND USES OF MINERALS

MINERAL	PHYSICAL PROPERTY	USES
Aluminium	✍ It is malleable. ✍ It is light. ✍ It is strong. ✍ It is ductile. ✍ It is a good conductor of heat and electricity. ✍ It can be alloyed. ✍ It has a high melting point. ✍ It is durable (no rust).	☞ For making bodies of automobiles. ☞ For bottling and canning. ☞ For packaging. ☞ For making roofing sheets. ☞ For making electric cables. ☞ For making cooking utensils.
Gold	✍ It is malleable. ✍ It is ductile. ✍ It can be alloyed. ✍ It is shiny. ✍ It is a good conductor of heat and electricity.	☞ For making medicine. ☞ For making coins. ☞ For making electronic instruments. ☞ Used in jewellery and art.
Copper	✍ It is a good conductor of heat and electricity. ✍ Resistant to corrosion. ✍ It is ductile. ✍ It is non-magnetic. ✍ It is easily joined.	☞ Used in construction. ☞ Used for making electric wires and cables. ☞ For making coins. ☞ For making chemicals. ☞ For making roofing materials.
Iron ore	✍ It is magnetic. ✍ It is strong. ✍ It is ductile. ✍ It is malleable.	☞ For making steel. ☞ For making magnets. ☞ For making auto parts. ☞ Used as a catalyst.
Uranium	✍ It is radioactive. ✍ It is hard. ✍ It is heavy. ✍ It is ductile. ✍ It is malleable.	☞ For making phosphate fertilisers. ☞ For making electronic instruments. ☞ It used in defense systems. ☞ For making nuclear-medicine x-ray machines.

Gypsum	✍ It is soft. ✍ It is soluble in water. ✍ It is sound proof. ✍ It is non-combustible. ✍ It has low thermal conductivity.	☞ For making fire and sound barriers in offices. ☞ For making fertiliser. ☞ For making cement. ☞ For sculpture.

MINING

FACTORS TO CONSIDER BEFORE MINING

1) The mineral content of the ore with regard to the cost of mining operations.
2) The difficulties that may be involved in mining.
3) Local geological conditions. If a vein is too thin to exploit or a seam is faulted, it is risky since it may causes disasters such as landslides.
4) Market accessibility and transport costs.
5) Local levels of technology and power supply.
6) Market demand must exceed the environmental problems likely to be caused.

METHODS OF MINING

- ✓ **Open cast mining**
- ✓ **Adit mining**
- ✓ **Shaft mining**
- ✓ **Alluvial mining**
- ✓ **Solution mining (in-situ leaching or in-situ recovery)**

a) OPEN CAST (STRIP OR SURFACE MINING)

- It is used where the ores lie close to the surface of the earth.
- It is also used when the land material containing the mineral is structurally not suitable for tunneling.

HOW OPEN CAST MINING IS DONE

- It involves the removal of over-mass, rock layers lying above the mineral-bearing strata and the ore is extracted.

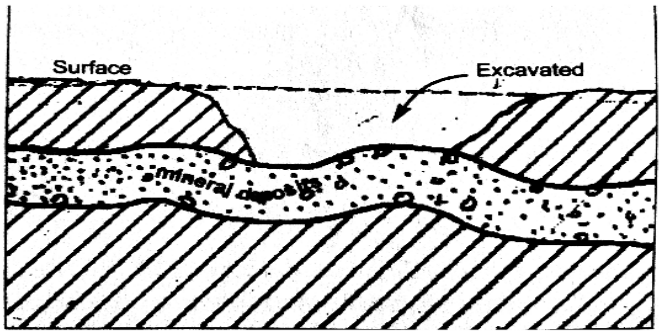
ADVANTAGES OF OPEN CAST MINING

- It is cheap.
- It is relatively easy.
- It is safe since operations are done on the surface.
- It allows easy mechanization of the operations.
- There is high rate of recovery of the mineralized material.

DISADVANTAGES OF OPEN CAST MINING

- It destroys agricultural land.
- It upsets the ecological balance.
- It damages the environment.
- It leads to relocation of people and animals.
- The mining site may be expensive or difficult to put to other uses after mining is done.

Open Cast Mining



b) ADIT (DRIFT) MIINING

- This method is used when mineral deposits protrude onto the surface of the earth. Mining starts from the surface and follows the layers of rocks containing the mineral.

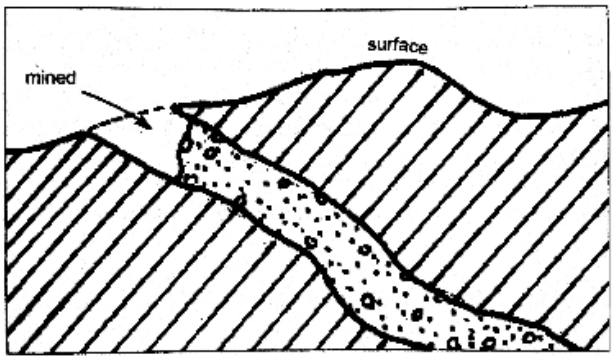
ADVANTAGES OF ADIT MINING

- Cheaper than shaft mining.
- Less energy needed to transport minerals and heavy equipment into and out of the mine.
- There is easy ventilation.
- It reduces damage to the physical environment.

DISADVANTAGES OF ADIT MINING

- It upsets the ecological balance.
- Damages the environment.
- It is difficult.
- It is expensive.
- It is only possible where the ground is strong enough for tunneling.

Adit Mining



c) SHAFT (DEEP) MINING

- It is used when the minerals are deep down the earth's surface.

HOW SHAFT MINING IS DONE

A shaft is sunk into the ground. As the shaft gets deeper, galleries are made to reach the ore. The rocks are blasted (broken into small pieces) and brought to the surface.

CONDITIONS NECESSARY FOR THE USE OF SHAFT MINING

☞The ore deposit is deep underground.
☞The ore body is steep.

☞The ore grade is high enough to cover the mining costs.

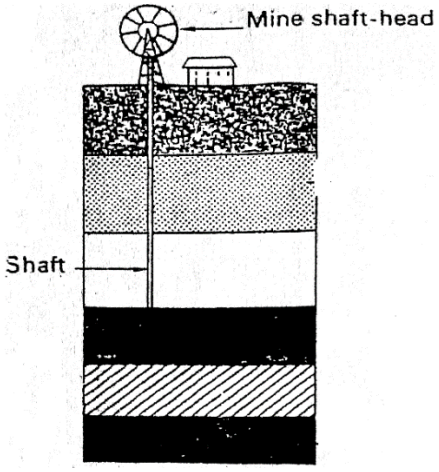
ADVANTAGES OF SHAFT MINING

- The land above the mining zone is easily reclaimed for other uses.
- It does not affect the physical environment as overburden does not need to be removed before mining.
- Noise and vibrations are confined to the underground locations.
- It is the only way of extracting minerals from deep layers of the earth.

DISADVATAGES OF SHAFT MINING

- It is very expensive.
- It causes a lot of pollution to the underground water.
- High possibilities for fatal accidents from heat, gases, flooding water and falling rocks.
- It is not possible to remove all the minerals as valuable ores are left in the pillars that support the structure of the mine.
- Underground water may affect the construction the mine.

Shaft Mining



d) ALLUVIAL MINING

- ✓ This is done when the minerals lie mixed in loose sediments such as clay, sand or gravel that accumulate in rivers or lakes.

IT IS DONE IN THE FOLLOWING WAYS:

i) Using forceful water from the hose pipes.

- ✓ The water washes away the light sediments. It is done especially when the minerals are in a river bank.

ii) Panning

- ✓ It involves scooping the minerals-bearing sediments into a pan, where it is then gently agitated in water and the denser minerals sink to the bottom of the pan, while the lighter minerals spill out of the pan.

iii) Dredging

- ✓ It is the underwater excavation of alluvial deposits using a bucket dredger. The machine has a chain of buckets that scoop the materials at the bottom of the water

body, and dumps it into a treatment plant where the minerals are separated from the sediments.

ADVANTAGES OF ALLUVIAL MINING

- ❖ It is easy.
- ❖ It is done without involving dangerous chemicals.
- ❖ It is cheap even when exploiting the low-concentration alluvial deposits.

DISADVANTAGES OF ALLUVIAL MINING

- ❖ It promotes the siltation of nearby water bodies.
- ❖ It creates large piles of rock fragments as mining progresses. This makes the land unattractive.

Alluvial Mining

e) SOLUTION (IN-SITU LEACHING OR IN-SITU RECOVERY) MINING

- ✓ This involves drilling of holes into the ore deposit through which a solution is pumped underground and into the ore deposit to dissolve the ore content.
- ✓ The solution bearing the dissolved ore content is then pumped up to the surface through another hole for processing to recover the minerals from the saturated fluid by recrystallization.
- ✓ It is used when the mineral deposits are too deep for other underground mining.
- ✓ This method can be used for minerals such as uranium, copper and salt.

ADVANTAGES OF SOLUTION MINING

- ➢ It is safer than sending miners underground.
- ➢ It provides access to deeper and richer resources.
- ➢ There is faster production.
- ➢ It is cheaper than conventional underground mining.
- ➢ There is little surface disturbance and no tailings or waste rock generated.

EFFECTS OF UNDERGROUND MINING

- ▪ It releases poisonous gases which pollute air.
- ▪ It is risky in terms of health to miners who inhale poisonous gases.
- ▪ Flooding may interrupt and disturb mining.
- ▪ Death of miners as tunnels collapse and rocks fall due to blasting.

POSITIVE EFFECTS OF MINING

- Creation of employment.
- Foreign exchange earnings.
- Infrastructural development.
- Provision of government revenue through taxation.

NEGATIVE EFFECTS OF MINING

- It results into landslides.
- Destruction of property and loss of life when the ground collapses.
- It leads to pollution, such as air, water and land.
- It leads to loss of soil infertility, which leads to low agricultural production.
- Water borne diseases when water collects in the mining pits.
- Unsustainable development.
- Soil erosion.
- Deforestation, leading to global warming.
- Reduction and extinction of animal and plant species when land is cleared for mining.

URANIUM

TYPES OF URANIUM ORE DEPOSITS

a) Unconformity deposits

- These host high grades relative to other uranium deposits and include some of the largest and richest deposits known.
- They lie between two rock masses in different ages.

b) Paleoplacer deposits

- These are fossilized deposits of dense mineral particles (they are originally formed at the surface by running water, are buried to sufficient depth to lithify the sediments into a solid sedimentary rock).
- These are often buried at depth and must be mined using underground methods.

c) Sandstone deposits

- These deposits are found near the surface of the earth.
- They are abundant in sedimentary rocks.
- They are formed when oxidised groundwater that has leached uranium from the surface rocks flows down into aquifers, where it is reduced to precipitated uranite

METHODS OF MINING URANIUM

- Open pit mining (open cast) mining
- Deep mining
- In-situ recover (in-situ leaching)mining

PROCESSING OF URANIUM

Once uranium is mined, all impurities are removed to obtain the yellow-cake (uranium oxide concentrate). This is done in the immediate mining sites. The following are the processes:

a) Milling and refining

- ❖ Uranium is crushed to reduce it to the desired size. It is then treated with an acid solution. If in-situ mining method was used, uranium is already dissolved in the solution. The uranium-bearing solution drains from the surrounding rock and waste materials and collected.

b) Precipitation and drying

- ❖ A solvent is introduced into the solution to turn the dissolved uranium into solid particles (this is called precipitation). Uranium precipitate is then obtained. It is then dried as yellowcake which is then packed in steel drums and transported to an enrichment facility.

c) Conversion

- ❖ The yellowcake is converted by chemical processes to uranium hexafluoride, which is later heated to become a gas and loaded into cylinders.

d) Enrichment

- ❖ The lighter U-235 atoms are separated from the heavier and more predominant U-238 portion. When the gas is cooled, it condenses into a liquid.
- ❖ This is done to make uranium usable as a fuel.

e) Fabrication

- ❖ A fuel fabricator converts (changes) it into uranium dioxide powder and presses the powder into fuel pellets. The fabricator loads the pellets into long tubes, which are grouped together into a bundle to form fuel assembly used in nuclear reactors.

USES OF URANIUM

- ☞ Used in nuclear power plants to generate electricity.
- ☞ It is used as a colourant in pottery and the manufacture of glass.
- ☞ For making phosphate fertilisers.
- ☞ To make nuclear weapons in the military sector.
- ☞ To determine the absolute age of rocks and other geological features.
- ☞ Used in x-ray machines and the diagnosis and treatment of diseases in the health sector.

World distribution and production of uranium

1) Australia
2) Kazakhstan
3) Russia
4) Canada
5) Niger
6) South Africa
7) Brazil
8) Namibia
9) USA
10) China
11) Ukraine
12) Uzbekistan
13) Mongolia
14) Jordan

AREAS WHERE URANIUM IS FOUND IN MALAWI

a) Kayelekere, Chilongo/Ngala, Chilumba (owned by Paladin)
b) Livingstonia, Nyika, Chintheche (owned by Red Rock)
c) Simulemba/Kanyika (owned by Globe Uranium)
d) Majete, Liungwe/Kirk Range (ownedby Africa Energy Resources)

THE KAYELEKERA URANIUM MINING SITE

- ✍ The estimated reserves of the uranium in 2006 was 12.5 million tonnes.

- The uranium here is a sandstone deposit, so it is extracted using open cast mining.
- Uranium is processed into the yellowcake at the mining site.
- It is transported via Zambia to Namibia and shipped to USA, Canada, France and China where it is converted.

IMPORTANCE (BENEFITS) OF URANIUM MINING IN MALAWI

- ✓ Creation of employment.
- ✓ Infrastructure development (roads, hospitals, schools, electricity, piped water, etc.).
- ✓ Provision of foreign exchange earnings after exports.
- ✓ Diversification of the economy.
- ✓ Provision of government revenue through taxation.

PROBLEMS (CHALLENGES) FACED IN URANIUM MINING IN MALAWI

- Industrial strikes.
- Land slippage (subsidence) due to earthquakes.
- Shortage of working materials.
- Fluctuation of uranium prices on the world markets.

NEGATIVE IMPACTS (EFFECTS) OF URANIUM MINING IN MALAWI

- ☞ Health risks
- ☞ Destruction of the environment
- ☞ Destruction of the environment through open-cast mining
- ☞ Water depletion
- ☞ Relocation of people
- ☞ Exploitation of local communities (through pollution of water)
- ☞ Tension in local communities due to unequal distribution of mining benefits such as jobs.
- ☞ Erosion of traditional values.

FACTORS THAT LIMIT THE ABILITY BY MANY AFRICAN COUNTRIES IN MINING

- Lack of expertise in mining.
- Lack of capital.
- Shortage of power supply.
- Weak mining legislation and corruption.
- Environmental factors since some minerals are located in unsafe places for mining.

PETROLEUM

OCCURRENCE OF PETROLEUM

- It occurs in its natural state called ***crude oil*** which is a compound of hydrogen and carbon. It occurs together with other substances such as water and natural gas (lighter hydrocarbons).

FORMATION OF PETROLEUM

- It is formed from the decomposition of minute (tiny) marine organisms, and is trapped in porous sedimentary rocks such as sandstone and limestone (these are source rocks), on the zone of sediments on the sea floor (sea bed). Oil is further squeezed out of the sedimentary

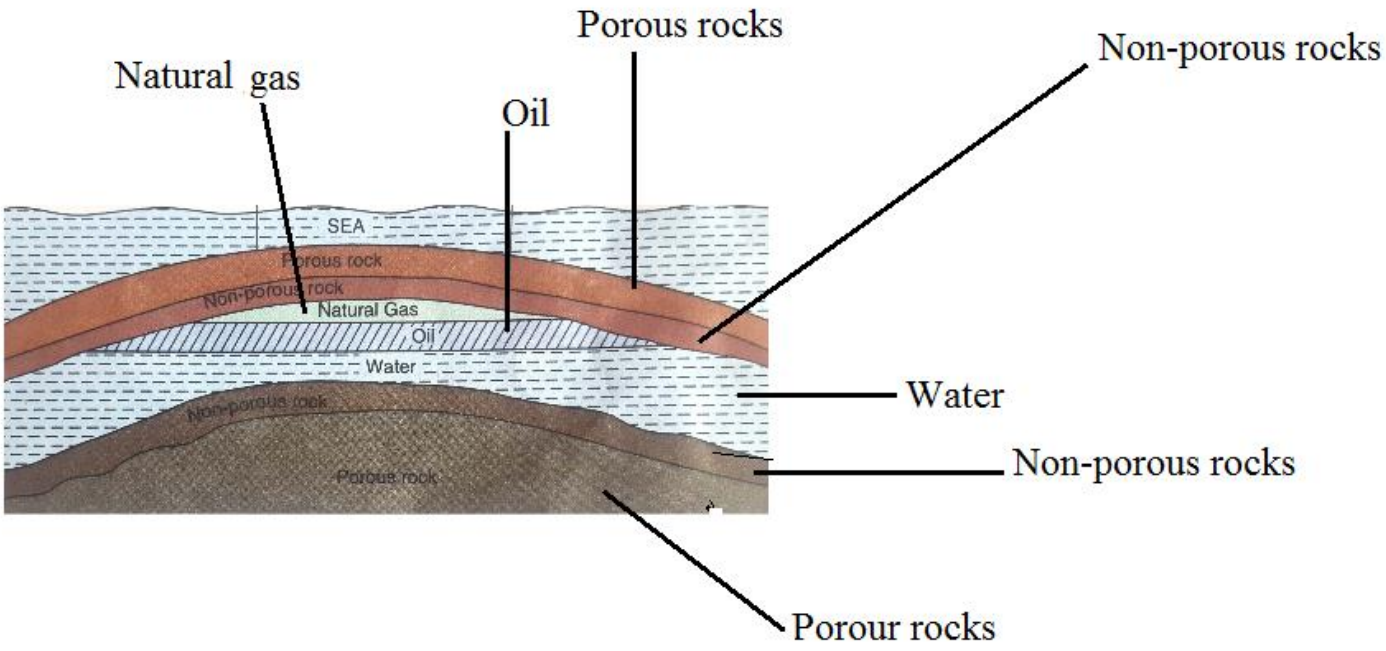
rocks into porous sedimentary rocks by earth's movements created by compressional forces.

- The rocks that contain these minerals are called ***reservoir rocks***.

CONDITIONS NECESSARY FOR THE FORMATION OF OIL

i. Passage of time, thus about several millions of years.
ii. Absence of air to avoid unnecessary reactions between molecules of hydrogen and carbon.
iii. Heat to promote decomposition of dead marine organisms by microorganisms.
iv. Great pressure to squeeze oil and natural gas out of original sedimentary rocks during earth's movements.

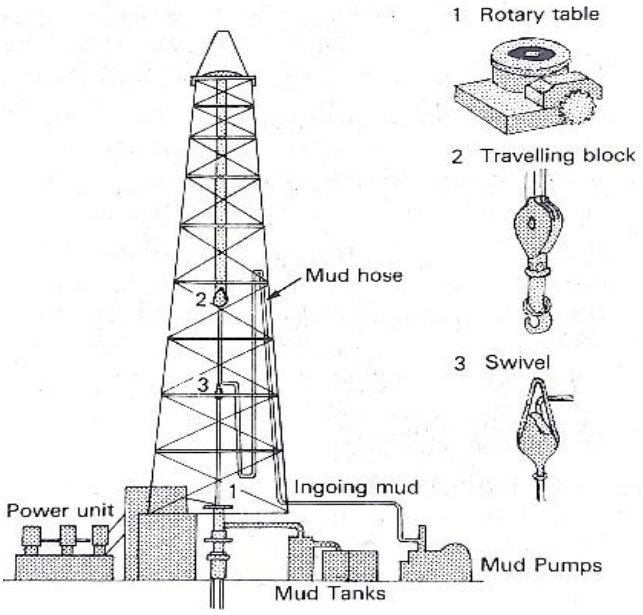
Occurrence of Oil Deposits in an Anticlinal Trap



HOW OIL IS EXTRACTED (DRILLED)

- Oil drilling is done by a derrick. A steel pipe originates from this structure and is fitted to a drill head called diamond cutter or bit. A hole is drilled from the surface to the rocks harbouring oil. Mud mixed with water is forced down the pipes to lubricate the bit and flush out the drilled-rock particles. Naturally, the oil gushes out if it is under pressure, and if not, it has to be pumped.

Oil Drilling (Extraction)



OIL REFINING (HOW PETROLEUM IS REFINED)

- Petroleum can be made pure by breaking it into various products in a refinery. This is done as follows:

a) Fractional Distillation

- The various groups of hydrocarbons split from crude oil at very high temperatures.
- The process of evaporation takes place as each fraction or hydrocarbons boils at different temperatures. This process is done in a **Fractionating Column**.
- It involves two main processes which are primary and secondary distillation processes.

1) PRIMARY DISTILLATION

- At this stage, various groups of hydrocarbons are extracted at their own boiling points as they condense into liquids (fractions).
- The ***lighter fractions*** such as **paraffin**, **petrol**, **kerosene** and **benzene** will be evaporated and condensed first, at temperatures below 38 degrees Celsius (38^0C) while ***heavier fractions*** such as **diesel**, **lubricating** and **fuel oils** will condense later at temperatures between 38 and 350 degrees Celsius (350°C).

2) SECONDARY DISTILLATION

- This is where the hydrocarbons of heavier fractions are further cracked to obtain lighter fractions. This happens because there is higher demand for lighter fractions than there is for heavy fractions. This process is done in four ways:

a) Thermal Cracking
b) Catalytic Cracking
c) Steam Cracking
d) Hydro-cracking

I) THERMAL CRACKING

- This is the process in which heavier fractions such as diesel and lubricating and fuel oils are further heated at relatively high temperatures (750ºC-900ºC) and under pressure in

separate tanks until they break (crack) to produce lighter fractions. This is done by a ***Cat-Cracker***.

II) CATALYTIC CRACKING

- In this process, a catalyst, such as zeolite, silica or platinum is added which allows the change to take place at a lower temperature and pressure.
- It helps to break down oil molecules, without affecting the chemical composition of oil.
- The catalyst and the hot oil vapour are added in a large cracking chamber called **reactor**.

III) STEAM CRACKING

- In this method, the hydrocarbons are diluted with steam and then briefly heated in a very hot furnace to around 850ºC without oxygen.

IV) HYDRO-CRACKING

- In this method, crude oil is heated at very high pressure in a hydrogen-rich environment, where platinum or nickel is added.

POLYMERIZATION

- It is a process in which simple hydrocarbon molecules combine into large molecular compounds.

IMPORTANCE OF POLYMERIZATION

- It increases the production of petroleum.
- It leads to the production of a variety of by-products such as synthetic rubber, plastics fertilizer and detergents.

PURIFICATION

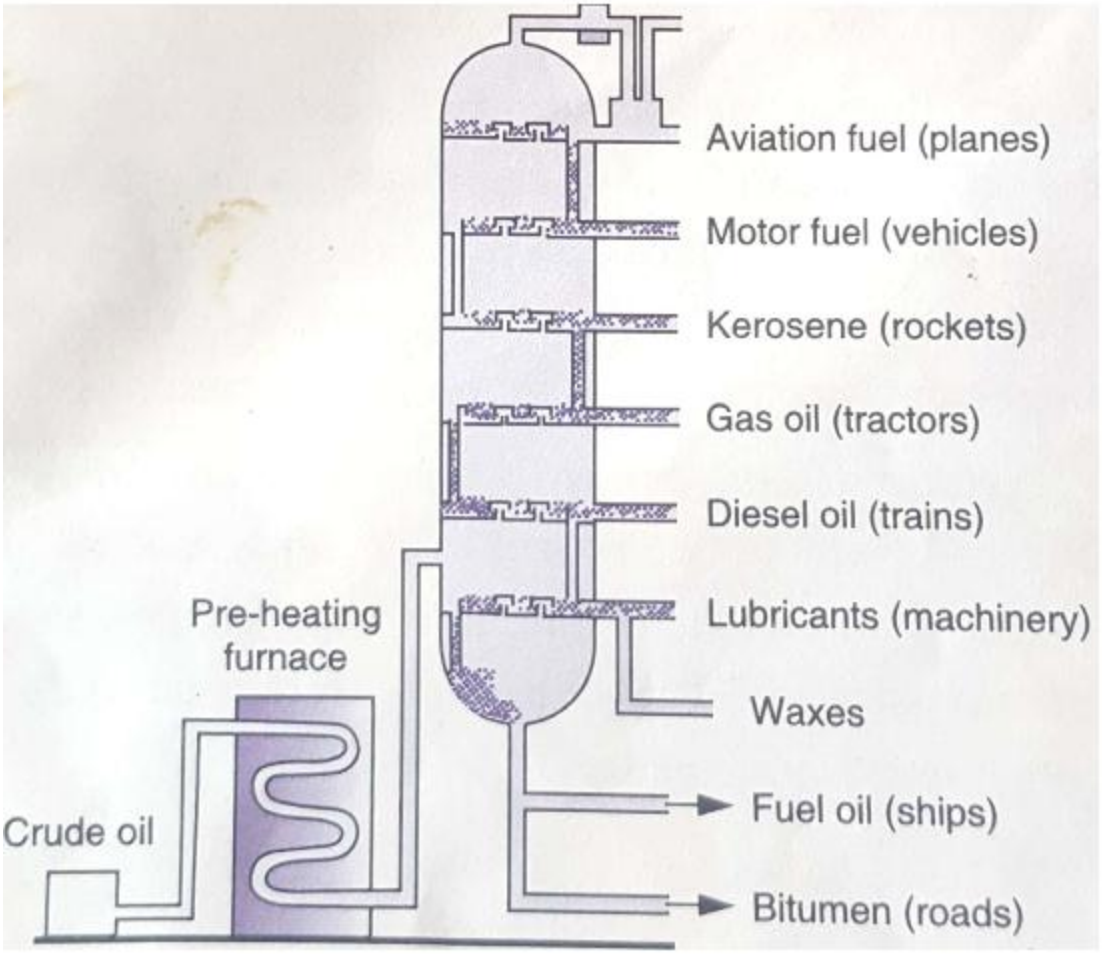
- This is the process of removing various impurities especially sulphur compounds from oil.

LOCATION OF OIL REFINERIES

i) In or near oil fields (Field-based refineries)
ii) At the ports of export (Intermediate refineries), an example is the Persian Gulf area.
iii) At the port of import (Market-based refineries). Examples include Singapore and Yokohama.

NOTE: Importing crude oil and refining it locally is cheaper than importing refined oil.

A Fractionating Column



USES OF PETROLEUM PRODUCTS

PETROLEUM PRODUCTS	**USES**
Natural Gas (such as methane)	Burning and heating
Petroleum Gases (butane Ethane)	For making chemicals
Motor Fuel (gasoline)	In land transport, production of electricity by using generators.
Kerosene	Used by jet aircraft, cooking, lighting and heating
Gas Oil	Made into diesel for lorries, buses, locomotives, etc.
Gasoline	For internal combustion of engines that drive most land transports
Bitumen (or Asphalt)	Used for making roads, roofing and waterproofing. (it is a black residue)
Lubricants	For making candles, seals and polishes
Gases	Is an alkane compound made up of butane, methane and propane
By-products	Raw materials for making plastics, synthetic rubber, varnishes, drugs.

PROPERIES OF FRACTIONS AT THE TOP

- ✓ Low boiling point
- ✓ Burn with a clear flame
- ✓ Light coloured
- ✓ More runny
- ✓ Burn readily
- ✓ Are smaller molecules

PROPERTIES OF FRACTIONS AT THE BOTTOM

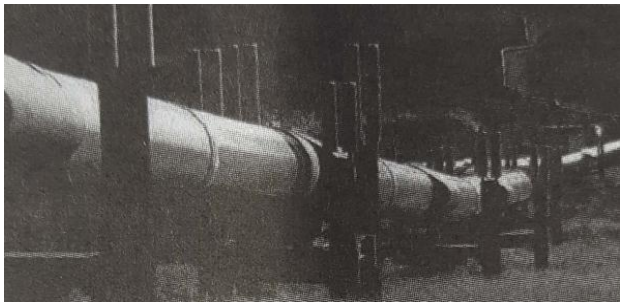
- ✓ Are thick
- ✓ Less likely to burn
- ✓ Are larger molecules
- ✓ Dark in colour
- ✓ Have long carbon chan
- ✓ High boiling point

TRANSPORTATION OF OIL

- The two main ways of transporting oil are by using **pipelines** and **tankers**.

a) PIPELINES

Pipelines



ADVANTAGES OF USING PIPELINES

- They are cheap to maintain and operate.
- Once built, their route is fixed and cannot be easily changed.
- Pressure has to be applied.
- Pipelines are easily damages by disgruntled people or by local anti-government groups. They need close inspection.
- They are not flexible once installed; this poses a problem when the reserves are depleted.

b) TANKERS

- These are mainly used for sea transport.

ADVANTAGES OF USING TANKERS

- The cost of building and operating a large oil tanker is cheap.
- It is a good way of transporting oil in deserts and where the land is mountainous which makes road and rail construction difficult or even impossible.
- It is the most efficient way of transporting oil

DISADVANTAGES OF USING PIPELINES

- They are very expensive to build (install).
- There are many problems in laying, inspecting and maintaining the network of pipelines.
- Precautions have to be taken to make sure that pipelines are in perfect functioning.
- Where the pressure is low, artificial

- It was economically viable to build supertankers to carry oil from the middle oil producers Far East (Singapore and Japan) at the time when the Suez Canal was closed.

DISADVANTAGES OF USING TANKERS

- Many ports do not have sufficient deep waters to anchor the supertankers.
- If the areas become rough, there are a lot of delays and risks of losing oil.
- Re-opening of the Suez has reduced the demand for supertankers.
- They are expensive to set up.
- They are slow.
- They are laborious.

- It leads to land, air and water pollution when tankers break and oil spill out.

OTHER WAYS OF TRANSPORTING OIL

c) OIL TRUCKS, RAIL WAGONS AND RAIL WAGONS

Rail Wagon

- These are used for transporting the refined petroleum products such as paraffin, diesel and petrol.

d) AIRCRAFTS

- These are used by military and emergency requirements to transport oil.

THE ROLE OF THE ORGANISATION OF PETROLEUM EXPORTING COUNTRIES (OPEC)

- It was on 14th September at a meeting held in Baghdad, Iraq by five founding members (Iran, Iraq, Kuwait, Saudi Arabia and Venezuela).
- This organization is responsible for the regulation and supply of petroleum products within the frameworks of national interests of its members.

THE ROLE (OBJECTIVES) OF THE ORGANISATION OF PETROLEUM EXPORTING COUNTRIES (OPEC)

i. It finds markets for oil.
ii. It fixes the price of oil per barrel.
iii. It controls the prices of crude oil.
iv. It controls by quota system the amount of oil each member country produces.
v. It used oil as an economic weapon which controls political development and trade.
vi. Makes member countries to meet and discuss ways and means of importation, exportation and production.
vii. To ensure that oil is supplied and regulated within the frameworks of national interests of its members.

SOME OPEC MEMBERS

REGION (CONTINENT)	OPEC MEMBERS
Africa	Algeria, Gabon, Libya, Nigeria.
Asia	Indonesia, Iran, Iraq, Kuwait, Qatar, Saudi Arabia, United Arab Emirates.
America	Ecuador, Venezuela.

AREAS WHERE OIL IS KEPT AFER ARRIVING FROM ABROAD

i. Chilumba (in Karonga)
ii. Chipoka (in Salima)
iii. Mchinji
iv. Kamuzu International Airport

OIL IN MALAWI

- In Malawi, The Shell, Mobile, Oilcom companies import crude oil from Saudi Arabia, Kuwait by tankers to Beira.
- At Beira, the oil is refined and oil products are carried by rail wagon to Blantyre.
- Some oil enters Malawi through Dar-es-salaam to the northern corridor by trucks to the port of Chilumba in Karonga. From there, it is transported to the other parts on Malawi by trucks and ships.

WAYS IN WHICH MALAWI WOULD BENEFIT IF IT UTILIZED ITS OIL RESERVES IN LAKE MALAWI (ADVANTAGES)

- The problem of oil shortages would be solved.
- Creation of employment to many people.
- Provision of foreign exchange after exports.
- It would lead to infrastructural development (roads, hospitals, etc.).
- It would be used as a source of exporting other commodities.
- The oil refining industries would be established.

PROBLEMS OF EXTRACTING OIL IN LAKE MALAWI

- Water pollution, leading to death of many aquatic animals such as fish due to suffocation.
- The tourism industry would be negatively affected since some beautiful scenery would be destroyed such as national parks, shores and beaches.
- Water would not be safe to drink. This would be a problem for people living in lakeshore areas that depend on water from the lake for their domestic purposes.
- The fishing industry would be negatively affected.

FACTORS THAT HAVE LED TO OIL CRISIS IN NIGERIA

- Low oil refining capacity.
- Low oil productivity.
- Conflicts
- Theft

ENVIRONMENTAL IMPACTS (EFFECTS) OF PETROLEUM DRILLING, REFINING AND TRANSPORTATION

- It damages to damage of the ecosystem.
- It leads to pollution (air, water and land pollution).
- It leads to climate change.
- It leads to the formation of acid rain.
- It leads to fires and explosions.
- Land degradation resulting from land pollution.
- Chronic occupational hazards.

TOPIC 6: WILDLIFE IN MALAWI

Wildlife is all animals, plants and other living things that live in the natural environment.

EXAMPLES OF WILDLIFE

- Lions

- Elephants
- Leopards
- Antelopes
- Rhinos
- Birds
- Frogs
- Snakes

Wildlife habitat

- This s the physical environment where animals live and find all the necessities such as food, shelter, water and space.

Examples of habitats

i. Forests
ii. Wetlands
iii. Lakes
iv. Rivers
v. National parks
vi. Game reserves
vii. Nature sanctuaries

Endangered species in Malawi

- These are species that are near extinction.

Examples of endangered species in Malawi

a) Elephants
b) Chambo fish
c) Lions
d) Leopards
e) Birds

National parks and game reserves in Malawi to conserve wildlife

National parks

- ✓ Nyika national park
- ✓ Kasungu national park
- ✓ Lengwe national park
- ✓ Liwonde national park
- ✓ Lake Malawi national park

Game reserves

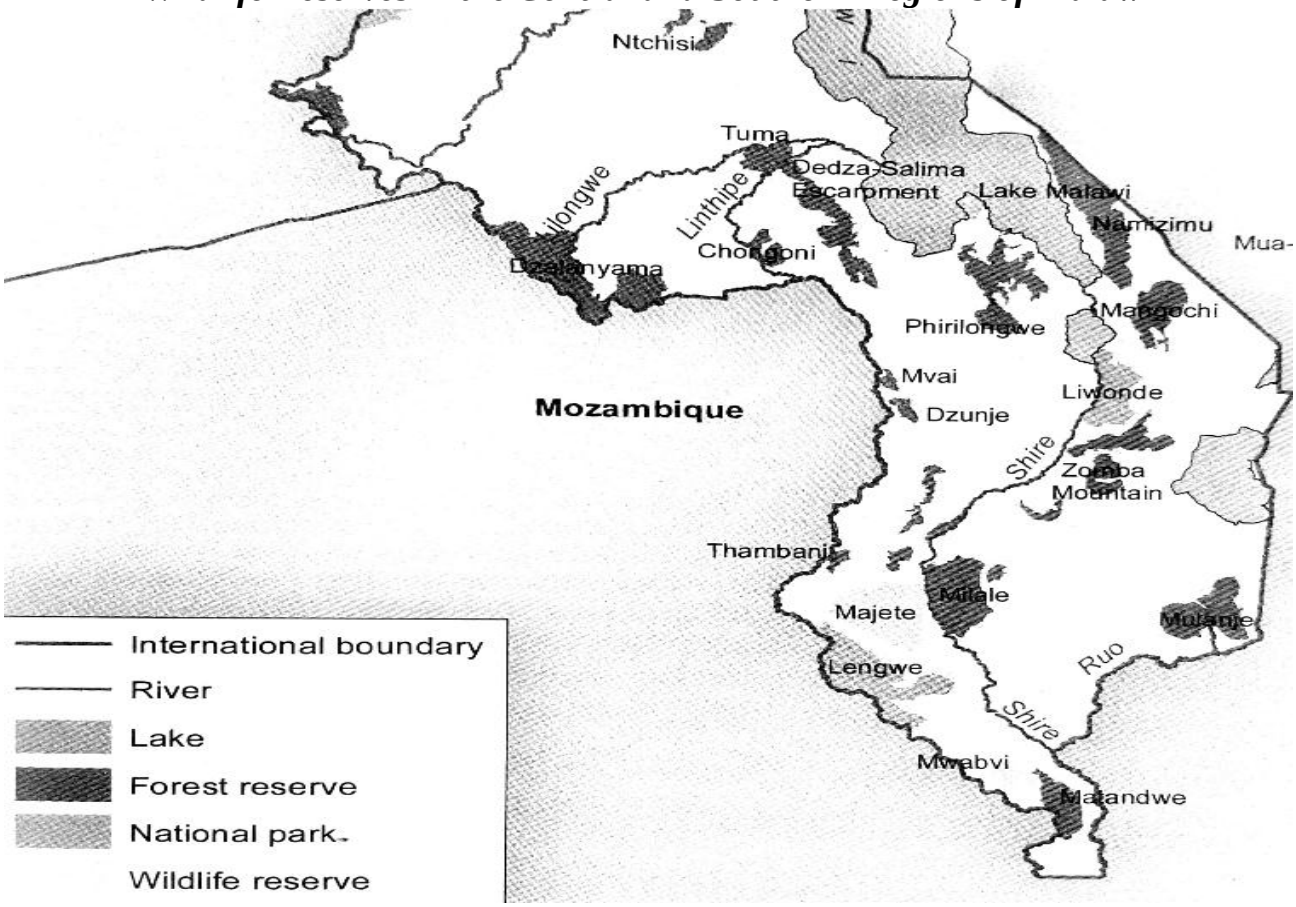
- ❖ Nkhotakota game reserve
- ❖ Vwaza game reserve
- ❖ Majete game reserve
- ❖ Mwabvi game reserve

DIFFERENCES BETWEEN GAME RESERVES AND NATIONAL PARKS

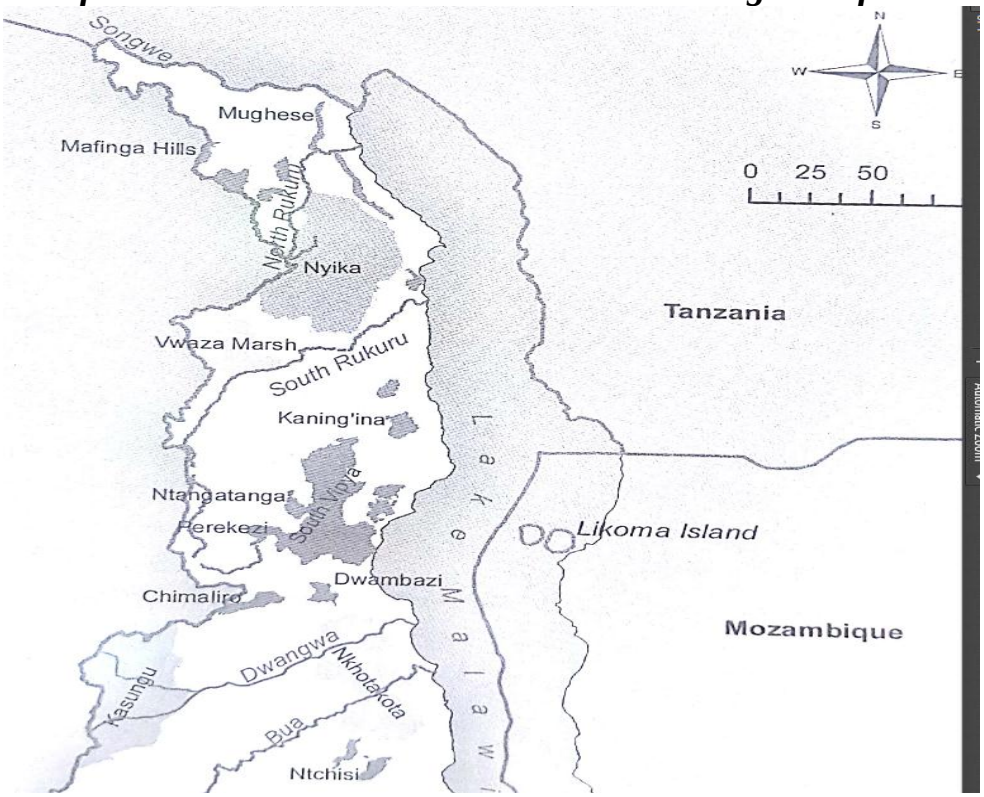
- A game reserve allows very limited or no access (entry) to the general public while a national park gives access to the general public.

- ✓ Game reserves are meant to preserve the area; people are not allowed to disturb or damage the environment.

Wildlife Reserves in the Central and Southern Regions of Malawi



Wildlife Reserves in the Northern and Central Regions of Malawi



NATURE SANCTUARY

- ✓ It is a place of refuge where abused, injured and abandoned captive wildlife may live in peace and dignity.

- ➢ An example of a nature sanctuary in Malawi is the Lilongwe nature sanctuary.
- ➢ In a nature sanctuary, animals do not become familiar with people.

Importance of wildlife in Malawi

1) It provides food to people.
2) It maintains the ecological balance by maintaining the food chains and webs.
3) It has economic value after sales of timber, gum, paper, etc.
4) It has medicinal value since plants and animals are used for making medicine.
5) Provision of raw materials such as ivory, leather, fur and honey for making things such as buttons, shoes, clothes, etc.
6) They are used for tourist attraction.
7) They have spiritual importance by being used as sacred objects in various religions.

ACTIVITIES THAT ENDANGER WILDLIFE IN MALAWI

Natural factors

- ✓ Landslides
- ✓ Earthquakes
- ✓ Volcanic eruptions
- ✓ Storms

❖ These factors can kill, deform the terrain and destroy the wildlife habitats.

Human factors

a) Rapid population growth

- ➢ This increases the demand for wildlife as people use them for food or creation of settlements or farming.

b) Agricultural expansion

- ➢ This leads to clearing of vast areas of land. This promotes extinction of plant species and food for animal species.

c) Urbanisation

- ➢ This increases the demand for large areas for settlements and farming. This promotes depletion of wildlife as habitats and food are destroyed.

d) Pollution

- ➢ Water pollution from agricultural chemicals and discharge of industrial wastes into water bodies endangers the aquatic species by suffocating them.
- ➢ Water pollution also makes water to be unsafe for use by wild species.

e) Deforestation

- This may result from uncontrolled bush fire. Deforestation destroys the habitats and food for wildlife.

f) Poaching

This means the illegal hunting of protected animals.

WAYS (MEASURES) FOR CONSERVING WILDLIFE

1. Creation of protected habitats such as national parks and game reserves.
2. Using alternative sources of energy such as solar energy to reduce the demand and pressure on forest reserves.
3. Awareness campaigns (civic education) on the importance of protecting wildlife.

TOPIC 7: STATISTICS IN GEOGRAPHY

DEFINITION OF TERMS

a. DATA

☞It refers to raw or unprocessed information.

b. PRIMARY DATA

☞It is the data that is used for specific purposes for which they were collected.

c. SECONDARY DATA

☞It is the data that is being used for some purpose other than that for which they were originally collected.

d. DATA COLLECTION

☞It is a means by which information is obtained from selected subjects of an investigation.

e. SAMPLE

☞It is an examination of the small or representative subset of the population.

SOURCES OF PRIMARY DATA

① Census (a population count)

② Samples (representative subjects of a population)

METHODS OF COLLECTING DATA

1. Questionnaires
2. Interviews
3. Observations
4. Measurements

❶ QUESTIONNAIRES

QUALITIES OF A GOOD QUESTIONNAIRE

- ☞ It should be short.
- ☞ It should not be personal.
- ☞ It should not be offensive.
- ☞ It should not involve calculations or test memory.
- ☞ It should have simple and unambiguous questions.

ADVANTAGES OF USING QUESTIONNAIRES

- ❖ It is cheaper than personal interview.
- ❖ It is less time consuming.

DISADVANTAGE OF USING QUESTIONNAIRES

- ▪ It may lead to collection of information not desired if respondents answer on their own.

❷ INTERVIEWS

TYPES OF INTERVIEWS

i. INDIVIDUAL OR PERSONAL INTERVIEW

- ☞ This involves interviewing interviewees by trained interviewers.
- ☞ Interviewees can be selected by **using random** or **quasi** sampling methods.
- ☞ In **random sampling**, each member of the population under consideration has an equal chance of being selected.
- ☞ **Quasi** sampling is used when random sampling is not possible, and members do not have equal chances of being selected (it has biases).

ii. STREET OR INFORMAL INTERVIEW

- ☞ In this interview, the interviewer is just one of the team members.
- ☞ The questions must be simple and short.

ADVANTAGE OF STREET OR INFORMAL INTERVIEWS

- It is accurate.

DISADVANTAGE OF STREET OR INFORMAL INTERVIEW

- It is expensive.

iii. TELEPHONE INTERVIEW

ADVANTAGE OF TELEPHONE INTERVIEW

✓ It is cheaper than direct interview.

DISADVANTAGES OF TELEPHONE INTERVIEW

✓ It can lead to aggravation (it can be worse).

✓ The interviewer needs to be skilled.

✓ Network problems can make it a failure.

❸ OBSERVATIONS

- This is used for examining items sampled from a work study.

ADVANTAGE OF OBSERVATIONS

✍ It is most accurate.

DISADVANTAGES OF OBSERVATIONS

✍ It is labour intensive.

✍ It is expensive.

❹ MEASUREMENTS

➢ This involves the drawing, reading and interpretation of **graphs**

WAYS OF PRESENTING DATA

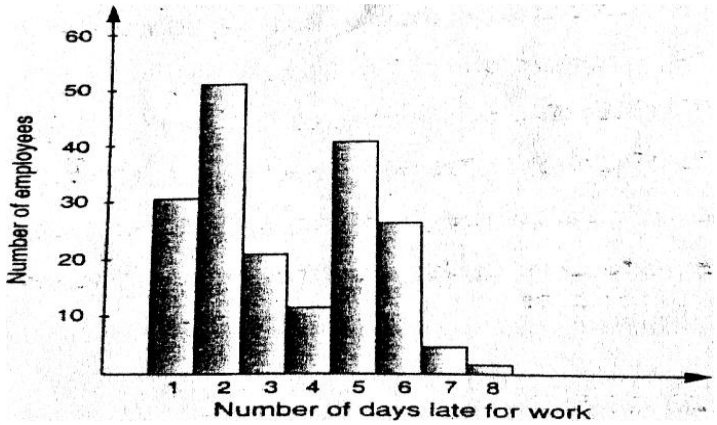
1) Histograms
2) Curve graphs
3) Tables
4) Flow diagrams
5) Age-sex pyramids
6) Statistical maps
7) Bar graphs
8) Pie charts
9) Pictograms
10) Line graphs

HISTOGRAM

- ✓ It has vertical bars.
- ✓ The bars are joined together.
- ✓ The chart as whole must have a title.
- ✓ The vertical axis (for frequency), and horizontal axis (for data values) must be scaled and labelled clearly.

A Histogram

Number of employees and number of days they come late for work

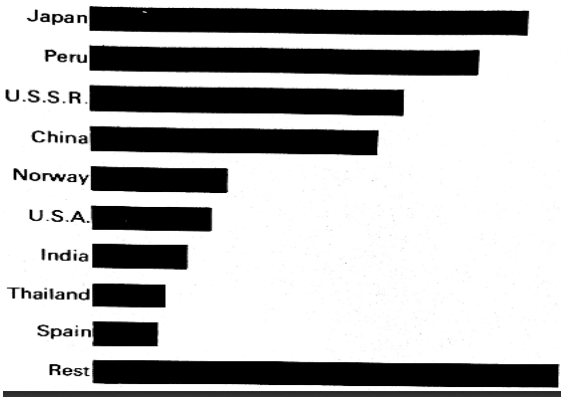


BAR GRAPHS

- ✍ The bars are not joined.
- ✍ The chart as whole must have a title.
- ✍ The bars can be drawn vertically or horizontally.
- ✍ The vertical axis (for frequency), and horizontal axis (for data values) must be scaled and labelled clearly.

Example of Bar Graphs

A



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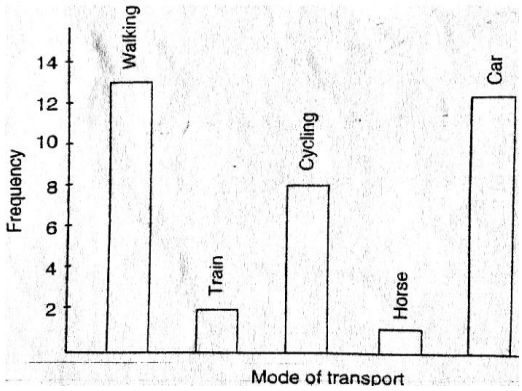


PIE CHART

- ❖ This is where the data being represented in total is shown in a single circle (a pie).
- ❖ The circle is split into sectors.
- ❖ The size of each sector is drawn in proportion to the class frequency.

STEPS TO FOLLOW WHEN DRAWING A PIE CHART

- ✍ Calculate the proportion of the total that frequency represents.
- ✍ Multiply each proportion by **360°**, to give sizes of relevant sectors in degrees that will be drawn.

EXAPMLE

① Draw a pie chart to illustrate the data in the table below. Use a radius of 5 centimeters.

COUNTRY	LIFE EXPECTANCY
Malawi	43
Mauritius	71
Mozambique	47
Namibia	59
South Africa	64

😐 To do this, follow the following steps carefully.

☞ Add all the life expectancy values, as follows:

43+71+47+59+64=284

☞ Calculate the proportion of the total that the frequencies represent.

MALAWI $=\frac{43}{284}\times 360° = 54.5°$

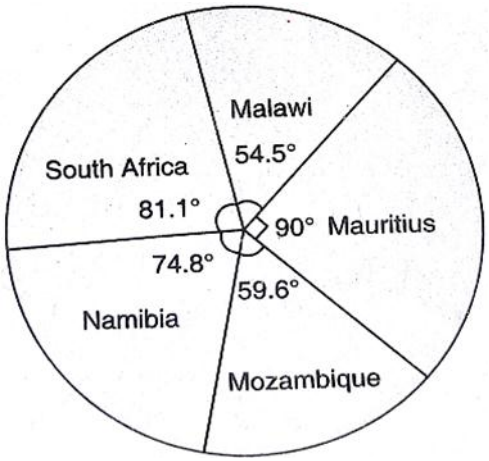
MAURITIUS $=\frac{71}{284}\times 360° = 90°$

MOZAMBIQUE $=\frac{47}{284}\times 360° = 59.6°$

NAMIBIA $=\frac{59}{284}\times 360° = 74.8°$

SOUTH AFRICA $=\frac{64}{284}\times 360° = 81.1°$

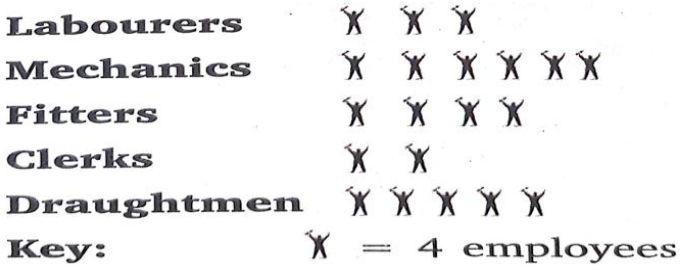
A Pie Chart for Life Expectancies in Some African Countries



❹ PICTOGRAM (IDEOGRAM)

- ✓ These are charts which represent the magnitude of numerical values by using only simple descriptive pictures.
- ✓ The pictures are duplicated in proportion to class frequency for each class.

A Pictogram



➢ For example, in the above diagram, there were (3×4=12 labourers, 2×4=8 clerks, etc).

TOPIC 8: WASTE MANAGEMENT

WASTE

- Waste is any material that is unwanted and has been discarded by the owner.
- It can either be in solid, liquid or gaseous forms, and can change its form over time.

WASTE MANAGEMENT

- It means the activities that deal with waste before and after it is produced.
- It may include its minimization, transfer, storage, recycling and final disposal.

TYPES OF WASTES

Based on Sources

1) Municipal wastes

- These are collected from homes, markets and streets and are disposed of by municipal bodies.
- Examples are food wastes, paper, plastics, rags, batteries, metals and glass.

2) Industrial wastes

- These come from industries.
- Examples of these wastes include paints, plastics, glass and metals.

3) Construction and demolition wastes

- These include plastics, solvents, wood, metals and bricks.

4) Agricultural wastes

- These are crop residues, empty pesticide containers and slaughterhouse wastes.

5) Clinical or medical waste

- These may include scalpels, needles and human parts that have been amputated.

Based on Properties

1) Biodegradable wastes

- These are the wastes that easily go bad. Examples include sewage and manure.

2) Non-biodegradable wastes

- These wastes do not easily decay. Examples are plastic bags, bottles, metals, tin cans, etc.

3) Hazardous wastes

- These wastes pose a risk to human health and the environment. They include paints, medical wastes, pesticides, electric wastes, etc.

4) Non-hazardous wastes

- These do not pose any health risks to human beings and the environment.
- Examples are cotton mills, sugar mills, textile industries, etc.

EFFECT OF POOR WASTE DISPOSAL

Environmental effects of poor waste disposal

a) Surface water contamination
b) Soil contamination
c) Land and air pollution
d) Leachates: This is liquid that forms as water trickles through contaminated areas.

Economic effects of poor waste disposal

- Loss of potential investors since these would prefer clean, and healthy areas.
- Loss of recycling revenue. There is also loss of job opportunities that come from recycling, and other related services.

WAYS (STRATEGIES) OF MANAGING WASTES

a) PREVENTION AND REDUCTION

- This means eliminating or reducing the quantity of waste which is produced. It may also involve the reuse of products.

Ways of preventing or reducing wastes

- ✓ Use of proper towels, plates and spoons in the homes than disposable ones.
- ✓ Carry your own shopping bags instead of bringing plastic bags home.
- ✓ Use of old post package boxes to send parcels instead of buying new ones.

b) RE USE

- ☞ This is using a product more than once.

Advantages of re use

- ☞ Reusable products are cheap.
- ☞ It reduces pollution.
- ☞ It requires few resources and less energy.

Disadvantages of re use

- ☞ Sorting and preparing items for re use is time consuming.
- ☞ Reused items may be hazardous or less energy efficient.
- ☞ The products to be reused need to be more durable.

c) RECYCLING

- ☞ This is where a discarded waste material is treated to make it suitable for subsequent re-use.
- ☞ An example could be compositing where organic waste materials are decomposed and used in agriculture as manure.

Advantages of recycling

- ☞ It helps reduce pollution.
- ☞ It promotes the development of greener technologies.
- ☞ Recycled products are cheap.

Disadvantages of recycling

- ☞ It is very expensive.
- ☞ Recycled products are not durable.
- ☞ Recycling areas are unsafe and unhygienic.

d) RESOUIRCE RECOVERY

- ☞ This is where a waste material is treated as a resource to be exploited, than a challenge to be managed and disposed of.

e) INCINERATION

- ☞ This means destroying waste materials by burning it.

Advantages of incineration

- ☞ It reduces the bulk of garbage.
- ☞ It can be used to produce electricity, and heat to be used in homes and offices.

Disadvantages of incineration

- ☞ It is expensive.
- ☞ It required skilled personnel to operate it.
- ☞ It emits a lot of toxic gases into the atmosphere.

f) LANDFILL

- ☞ This is where the wastes are buried in natural or excavated holes.

Advantages of landfills

- ☞ It is relatively cheap.
- ☞ It is a specific location that can be monitored.

IMPORTANCE OF PROPER WASTE MANAGEMENT

- ✍ **Environmental health:** It helps reduce water, air and land pollution. This makes the environment safe for living.
- ✍ **Creation of employment:** In waste management industries.
- ✍ **Aesthetic value:** It promotes the keeping of communities clean and pleasant.
- ✍ **Public health:** Keeping the environment clean reduces the risk of diseases.
- ✍ **Creation of revenue:** Wastes can be changed into compost which is sold for money.

CHALLENGES OF WASTE MANAGEMENT IN DEVELOPING COUNTRIES

a) Rapid urbanization: More wastes are produced than the rate at which they are managed.
b) Weak institutions: They fail to monitor and enforce regulations.
c) Under-funding: E.g. from the government of waste management/7.
d) Lack of knowledge: In waste management