

REGIONAL

GEOGRAPHY OF AFRICA

NB: This is the rest of Africa, so avoid examples from East Africa

Introduction

Africa is one of the six continents in the visible world and the second largest continent after Euro-Asia. Covering an area of about 30,368,609sqkm, which is 20% of the world's land mass, comprising 64 political territories including adjacent islands.

It has a population of 1.311.000.000 billion people having a population density of 32/km² accounting for 15% of the world's population with a growth rate of 92.293 million pa.

The continent is strategically located astride the equator crossed by the three latitudes i.e.

- Tropic of Cancer in the north
- Equator in the central and
- Tropic of Capricorn in the south

N.B: About 77% of the total land area in Africa lies within the Tropics i.e. between the Tropic of Cancer $23\frac{1}{2}$ degrees in the north and Tropic of Capricorn $23\frac{1}{2}$ degrees in the south.

It is also crossed by the major longitude called Greenwich Meridian.

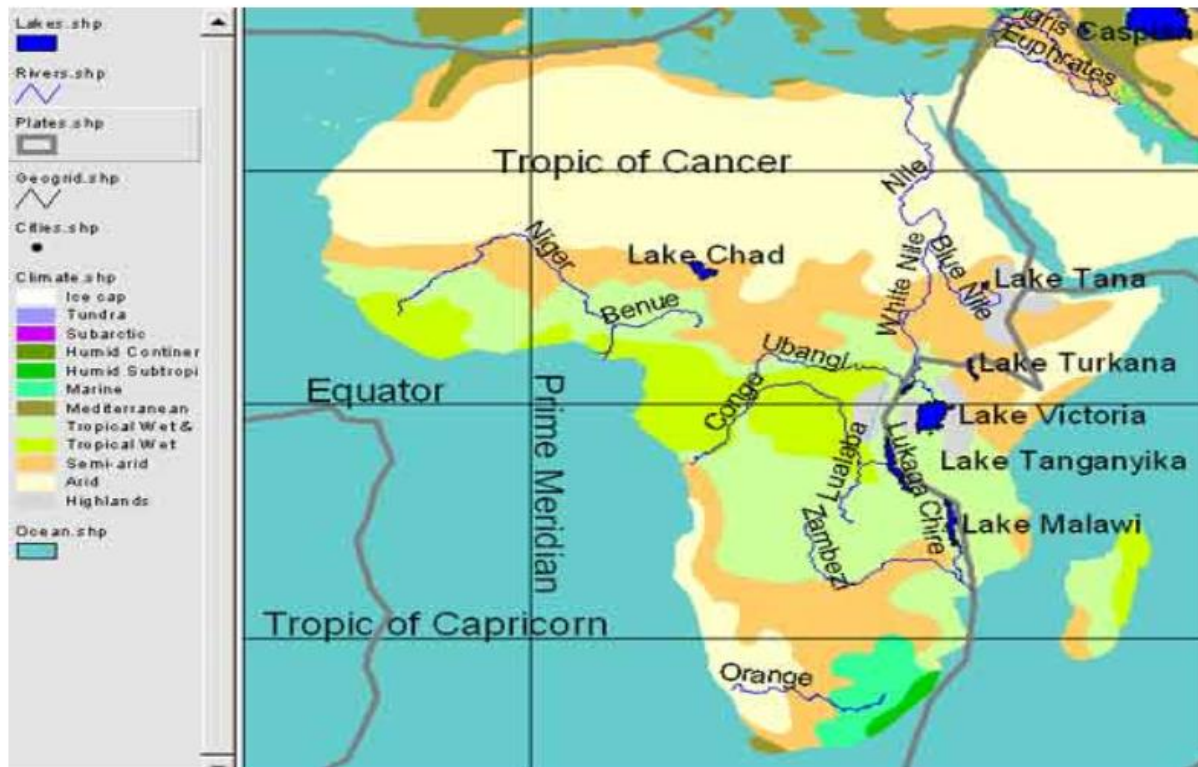
Africa is also substantially occupied by the Sahara desert in the north and the Kalahari in the southwest. It is bordered by extensive water bodies like the Mediterranean Sea in the, the Red sea in the, ocean in the east and the ocean in west having a continental shelf of about 300 km and a coastline that is estimated between 26,000- 30,400 km.

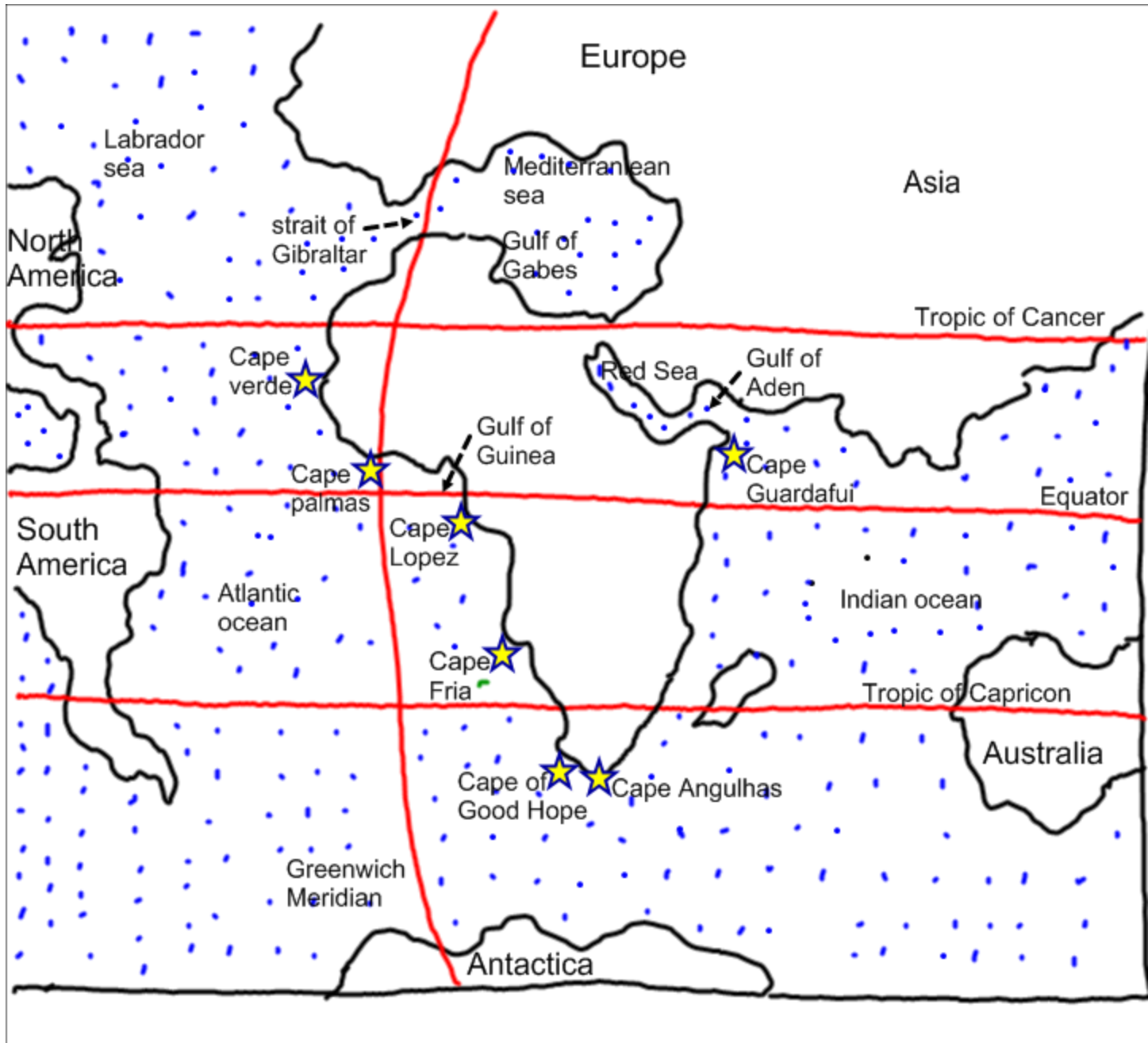
It is also surrounded by land masses like the Euro-Asia in the north, Australia in the east, Antarctica in the south, North and South America in the west.

Africa is also characterized by different ethnic groups, Bantu being the largest, Nilotic, Hamites among others.

Sketch map of Africa showing

Major latitudes, longitude, neighboring water bodies and continents





RELIEF OF AFRICA.

Relief refers to the physical or natural appearance of the general landscape.

Africa is endowed with a spectacular landscape ranging from plateau/plains, basins,

highlands/mountains, rift valleys, etc. Their origin is attributed to a number of geological processes e.g. Vulcanicity, faulting, folding etc.

A sketch map of Africa showing Relief.

Plateau

It refers to a generally flat raised landscape that covers a wide area (a plateau has no peak like a hill). Africa has many plateaux that are higher in the east and lower in the west ranging between 600m - 2000m above sea level. E.g. Central plateau in east Africa, Bie plateau in southwest in Botswana, Jos plateau in west in Nigeria, Kalahari stretch in Namibia, Great Karoo in South Africa, etc.

Importance

- Conducive for grazing and cultivation due to the flat nature that ease movement and mechanization.
- Mineral mining e.g. oil in the Kalahari stretch
- Tourism due to abundant fauna and flora e.g. the Kalaahari stretch in western Botswana, Eastern Namibia.
- Wild life conservation due to existing fauna and flora e.g. the Kalahari stretch in Namibia.

- Stone quarrying due to rock outcrops which are blasted for construction.
- Areas of recreation through motor rallying, bird watching, desert walks due to its flat nature.
- Human settlement e.g. the Karoo in South Africa and the Jos plateau in Nigeria.

Plain

This refers to a generally flat low land and covers many miles.

It was formed due to perennial erosion for a long time that removed large amounts of soil from the earth's crust between the east and west coast highlands. E.g. the Veld in South Africa, Sahel region in North Africa, etc.

The plain can also be formed due to the flowing of basic lava that is fluid in nature and takes long to solidify on the earth's surface.

Importance (consider those of plateau above)

Illustration





Basin

This refers to a saucer shaped depression that is found mainly between a plateau and mountain. It is formed by faulting or down warping when two adjacent land masses are raised leaving the central block to sink forming a saucer feature. Basins become water bodies when filled with water e.g. Nile basin, Orange Zambezi basin, Niger basin, Congo basin, etc while those that are empty are called depressions e.g. Qattara basin, Chad basin, Okavango basin, etc.

Illustration



BASIN OR DEPRESSION



Importance

- Water reservoirs
- Important for fishing in the various lakes.
- Aquatic life conservation

- Tourism due to fauna and flora
- Mineral mining especially oil
- Areas of recreation
- Industrialization due to the presence of water for cooling machines and as a raw materia

Mountain

This refers to a cone shaped landform that is many meters above the sea level formed by faulting, folding and vulcanicity giving rise to block mountains, Fold Mountains and volcanic mountains.

Volcanic mountains- these are formed when molten magma from the earth's interior is exposed to the surface of the earth through a vent exploding into the air thus cooling to form a cone shape. E.g. Ethiopian highlands, Cameroon highlands, Futa Djalou mountains, mount Giluwe, etc

Illustration



Importance

- Mineral mining e.g. iron ore, cobalt, copper, etc
- Tourism attraction due to fauna and flora
- Source of rivers
- Human settlement on the gentle fertile slopes.
- Agriculture is possible due to the presence of fertile soils.
- Forestry and flora conservation
- Lumbering
- Recreation and research, education
- Stone quarrying
- Wild life conservation

Disadvantages

- Little or no rain at the leeward side affecting settlement, grazing and cultivation
- Soil erosion on the steep slopes
- Landslides, rock fall and mud flows on steep slopes and volcanic eruptions that interrupt movement and activities.
- Land fragmentation due to high population
- Low temperatures on high altitudes
- Forested mountains harbor wild animals and rebels
- Difficulty in transportation and construction

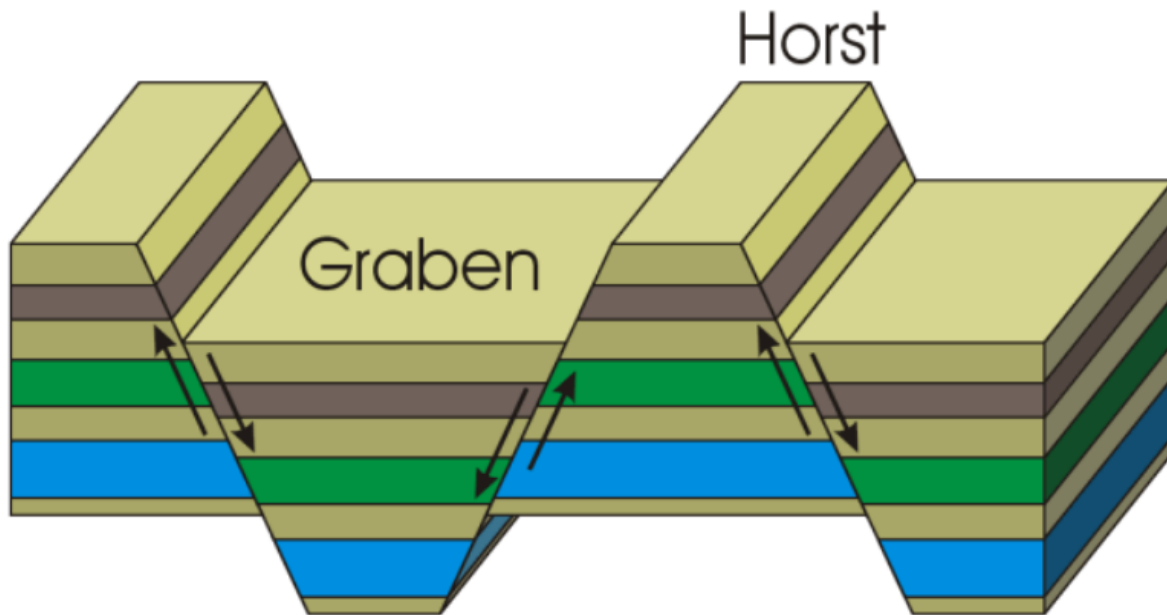
Fold mountains- these are formed when compressional forces act against the earth's crust with extreme pressure leading to synclines (valleys) and anticlines (hills). The many anticlines form the Fold Mountains in form of ranges. E.g. the Atlas and Drakensburg mountains.

Illustration



Block mountain- these are formed by faulting when compressional forces act upon the earth's crust leading to lines of weakness/fault lines forcing the central block to rise higher than the other blocks making the central block project as a horst or the adjacent blocks sink lower than the central block leaving the central block projected out as a horst. E.g. (Avoid examples from East Africa)

Illustration



Rift valley

This refers to a long narrow depression that is bordered by fault scarps on either sides formed by faulting of the earth's crust leaving behind a trough.

The great African rift valley is about 7200 km and 5600 km is in East Africa with a varying width of 30 to 60 km stretching from the Red sea in the northeast to river Zambezi in Mozambique.

In east Africa the rift valley subdivides in central Tanzania giving rise to the eastern arm in Kenya and Tanzania and the western arm in Tanzania, Burundi, Rwanda and Uganda. It has small depressions on the

valley floor called grabens that were filled with water giving rise to rift valley lakes e.g. lakes like Turkana, Baringo, Natron, Naivasha, Rukwa, Nyasa, Tanganyika, Kivu, Edward and Albert lake.

Formation

The African Rift valley was formed by tectonic forces particularly faulting which can be explained in three basic theories;

- Tensional force by Gregory
- Compressional force by Wayland
- Differential uplift by Dixey and Troupe

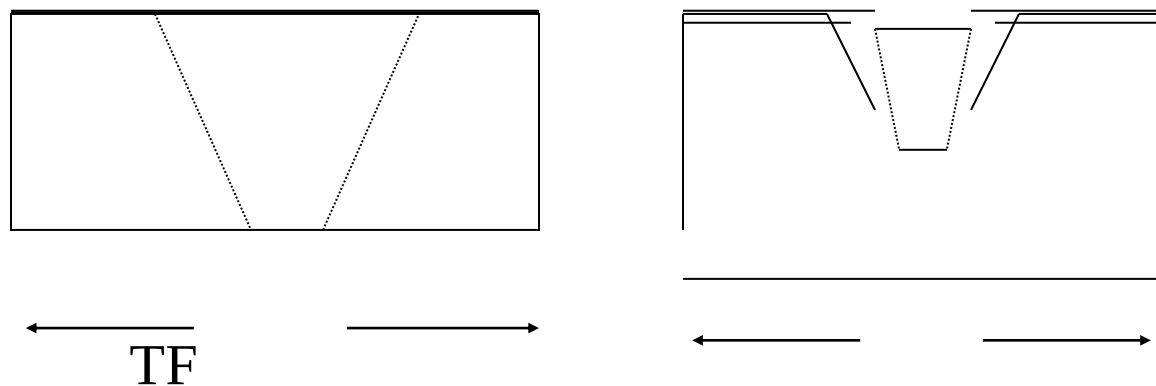
Illustration



Tensional force theory (Gregory)

The earth's crust is acted upon by tensional forces that pull away the earth's core forming normal lines of weakness. The crust is sub-divided into blocks where the adjacent blocks are forced to rise while the central block forms a trough called a rift valley. This is more in the eastern arm of the rift valley in Kenya.

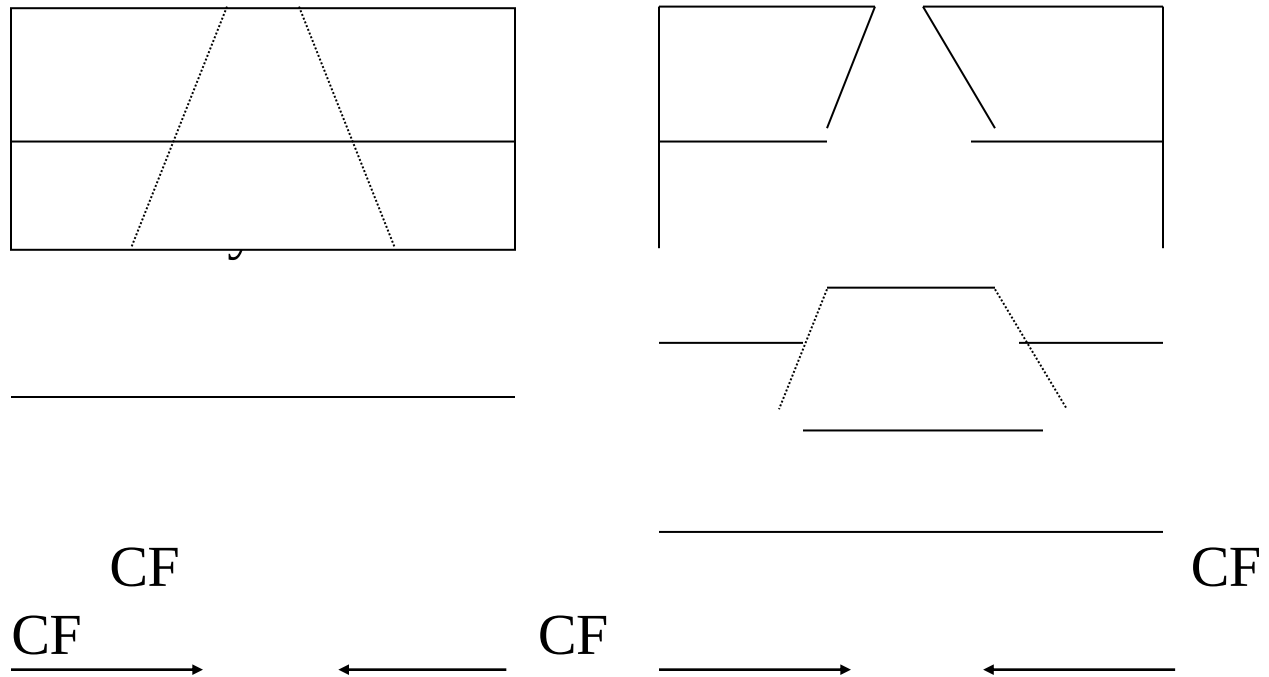
Illustration



Compressional force theory (Waylland)

The earth's crust is acted upon by compressional forces that pull towards the earth's core forming reverse fault lines. This sub-divides the earth's crust into blocks where the adjacent blocks rise with projected scarps which are acted upon by denudation forming a well structured rift valley. This is visible in the western arm in the Albertine area.

Illustration

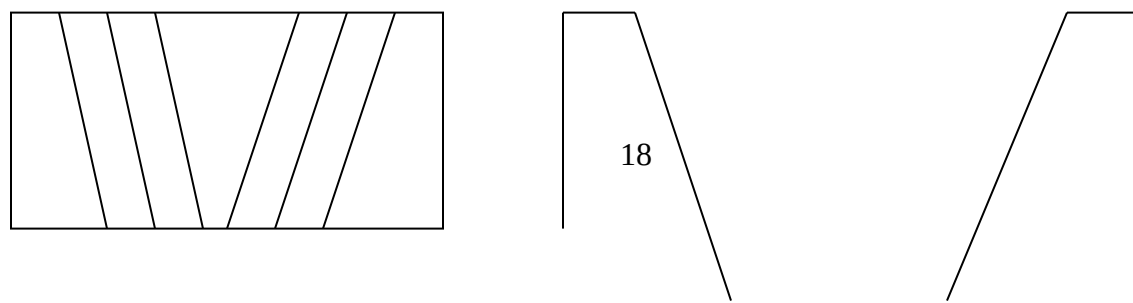


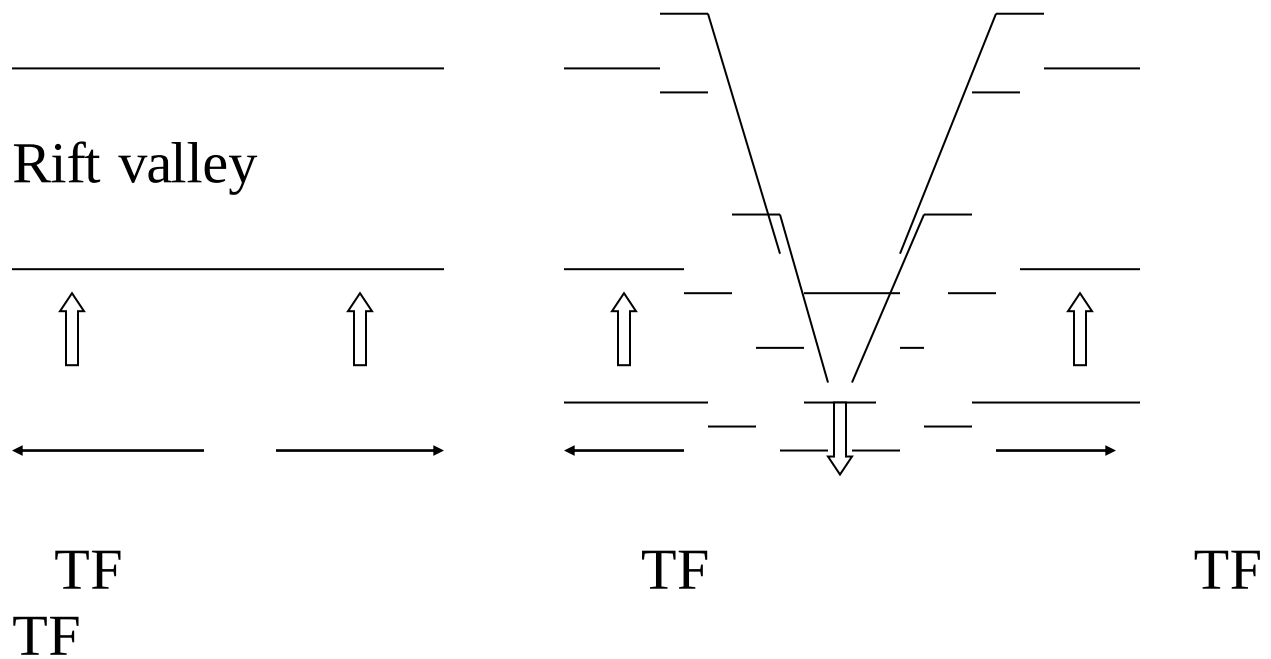
Differential uplift theory (Dixey and Troup)

The earth's crust is acted upon by tensional forces forming various lines of weakness which are also supplemented by up-warping and down-warping raising the adjacent blocks to different heights. This leaves the central block at a lower elevation forming the rift valley.

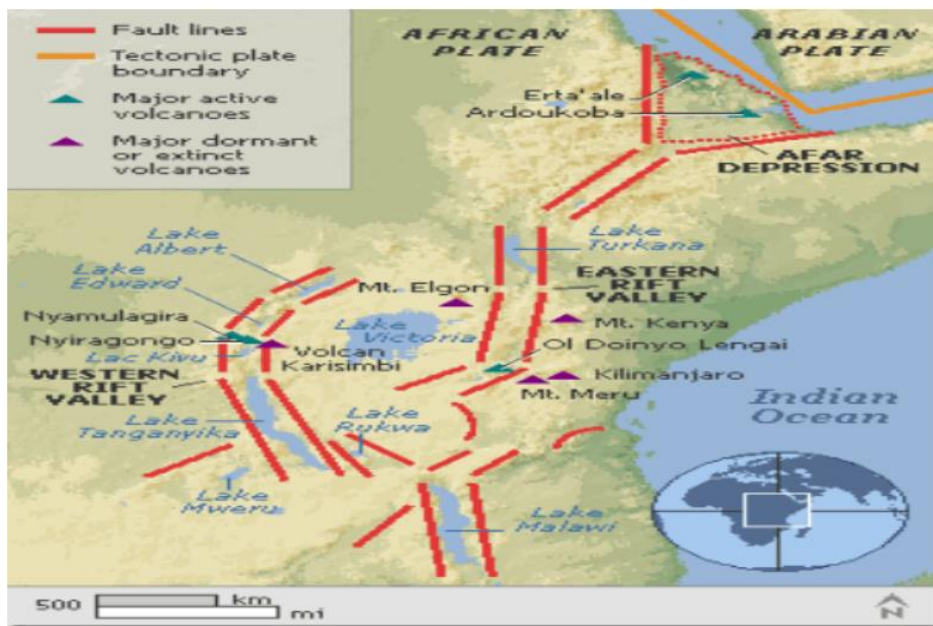
This explains the rift valley stretch of East Africa near Nairobi.

Illustration





Sketch map showing extent of the rift valley



Importance

- Mineral exploitation in the grabens/lakes like soda ash.
- Gentle slopes of the scarps are used for agriculture due to fertile soils
- Fishing in the graben lakes.
- Wild life conservation of the fauna and flora
- Livestock farming in the dry grassland belts.
- Human settlement on the gentle slopes and due to fertile soils that support agriculture.
- Tourism due to beautiful scenery
- Industrialization due to the presence of graben lakes that provide fresh water
- Forests on the slopes are sources of timber for industrialization and construction.
- Transport in the graben lakes hence easing movement of passengers and cargo.

Problems

- Flooding of the rivers like the Nile in the western arm
- Steep scarps limit transportation, construction and settlement

- Remoteness of some areas because they aren't connected to the major infrastructures like roads, due to their steepness.
- Prone to landslides and rock fall because of the existence of mountains around which when disturbed by earthquakes, rocks can easily break and fall off.
- Western arm is dry being in the rain shadow zone hence can not favour agriculture and settlement.
- High temperatures in the valley floor due to low altitude
- Some lakes are salty which discourages agriculture and industrialization.
- Earthquakes may destroy people's property.

GORGE.

It is a deep narrow steep sided valley formed in the youthful stage of a river due to mainly vertical erosion.

It is formed when a river flows across a landscape made of alternating soft and hard rocks.

The soft rock is undercut or eroded deeper leaving the hard rock projected out. E.g on R. Zambezi in

Mozambique (quebra gorge),Black river in Mauritius,Fish river in Namibia etc.



Importance.

It is a tourist attraction earning a lot of foreign exchange to countries.

- It is ideal for hydro electric power production e.g Quebra gorge having Cabbora bossa dam in Mozambique.
- It provides ground for recreation and leisure activities.
- It's narrowness is ideal for bridge construction.

DRAINAGE OF AFRICA

Drainage refers to the hydrological system comprising of rivers, lakes and seasonal or permanent swamps.

Africa is endowed with many rivers e.g. the great Nile (Uganda, Sudan, Egypt), the Niger (Nigeria, Niger, Burkinafaso, Liberia), the Congo (DRC), the Zambezi (Zambia, Zimbabwe, Mozambique), the Orange/Vaal (south Africa), Limpopo (Botswana, south Africa, Swaziland, Mozambique, Shibeli (Ethiopia, Somalia), etc.

Major lakes include Victoria (Uganda, Kenya, Tanzania), Nyasa/Malawi (Tanzania, Malawi, Mozambique), Nasser (Sudan, Egypt), Chad (Chad republic), Tana (Ethiopia), etc with seasonal and permanent swamps like lake Kyoga in Uganda.

Factors influencing drainage

Africa's drainage is determined by four major factors which influence its nature of flow on the earth's surface i.e. relief, nature of rocks, gradient/slope and volume of water.

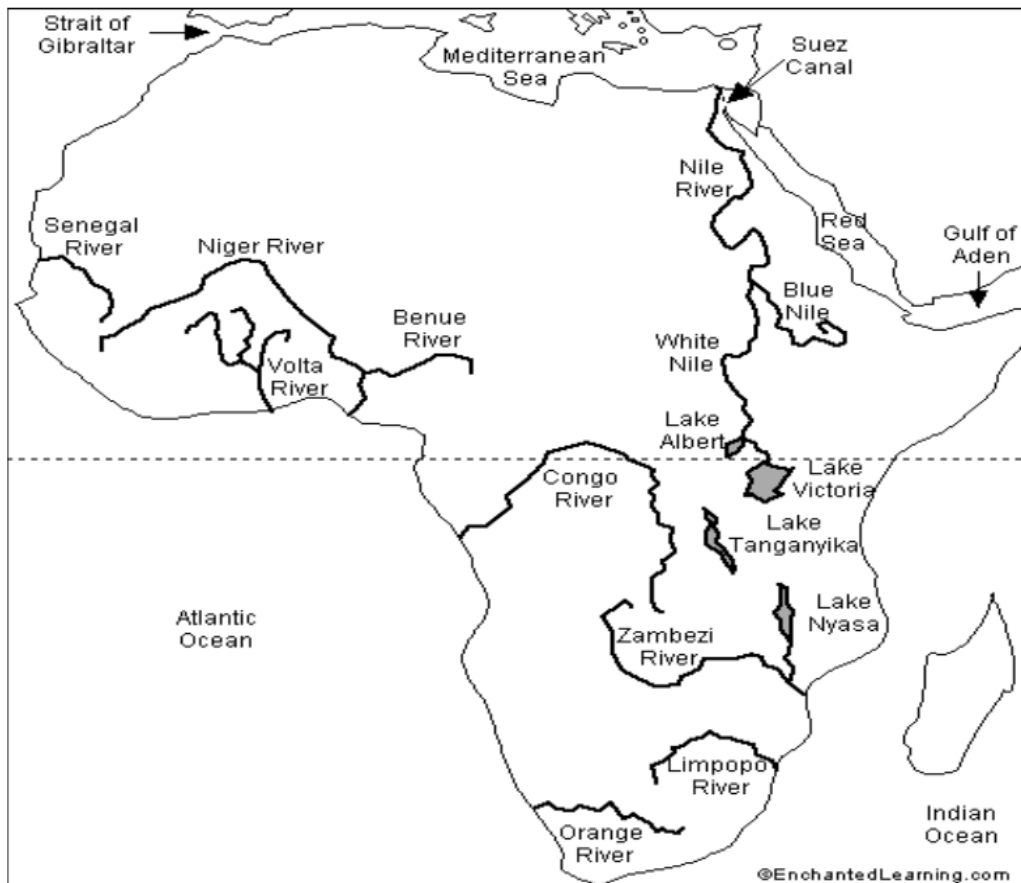
- **Relief-** this refers to the general appearance of the landscape e.g. mountains, valleys, plains, etc. rivers flowing in mountainous areas tend to diverge in the course when trying to avoid raised landforms. However rivers flowing on plateaux and plains tend to develop a regular course due to less interruption in the flow pattern.
- **Nature of rock-** rock composition of the earth's crust influences the flow of a given river. Rivers flowing in areas of hard rocks tend to meander towards areas of soft rocks developing new flow channels or river course. However rivers that flow in areas of soft rocks develop a regular course though others create meanders with oxbow lakes, flood plains and levees/ braided channels.
- **Gradient/slope-** this refers to the proportionate elevation of a river's course from the source to the mouth. Rivers flowing in areas of high gradient tend to develop a straight course which is supported by gravitational pull and acceleration/ velocity of flow.

However, rivers flowing in areas of gentle or very low gradient easily spread on the earth's surface developing meanders and ox-bow lakes and levees/braided channels.

- **Volume of water-** the amount of water carried by a river at any time in its valley along the course from the source to the mouth affects its flow relating to rejuvenation and river capture. When rivers obtain more water from heavy rainfall they are rejuvenated/strengthened with more erosive power. This may lead to capturing of a neighboring weak river terminating its flow course.

As for the rivers flowing with low volume of water, thus they have low flow speed and erosive power leading to deposition of sediments in the river bed or valley flow.

Sketch map showing major rivers and lakes

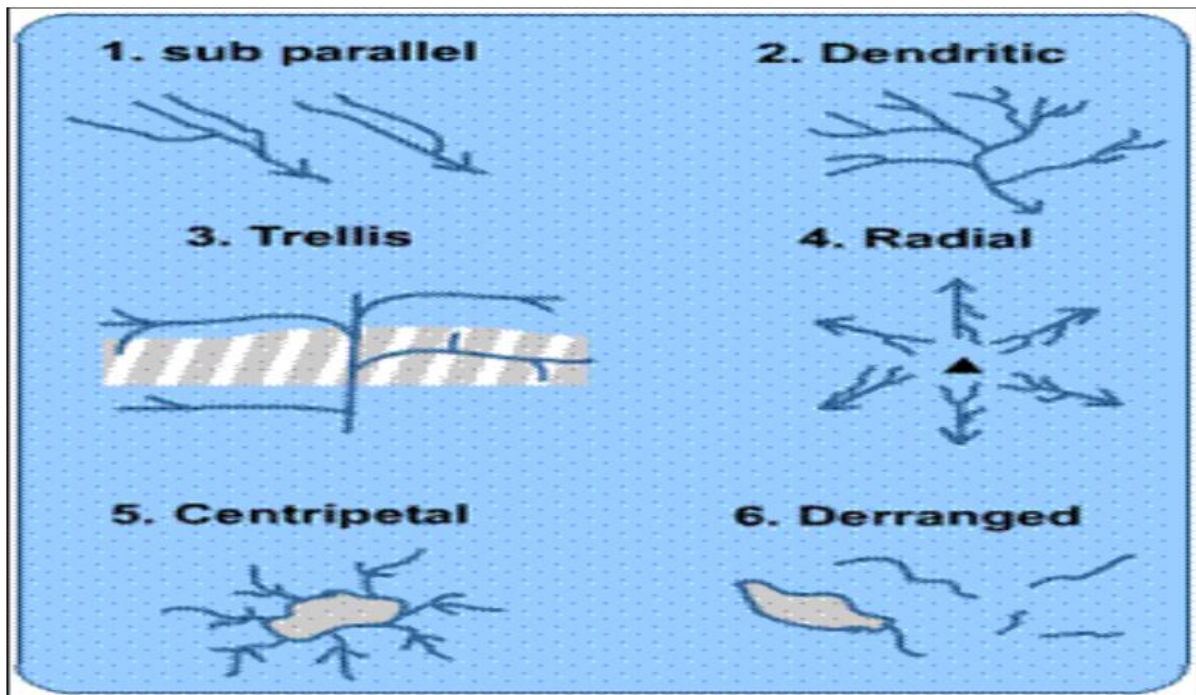


Drainage patterns

This refers to the general lay out plan made by a river and its tributaries on the surface of the earth.

Africa has got a variety of drainage patterns which include trellis, dendritic, parallel, braided, antecedent, radial, centripetal and fault-guided.

Illustration

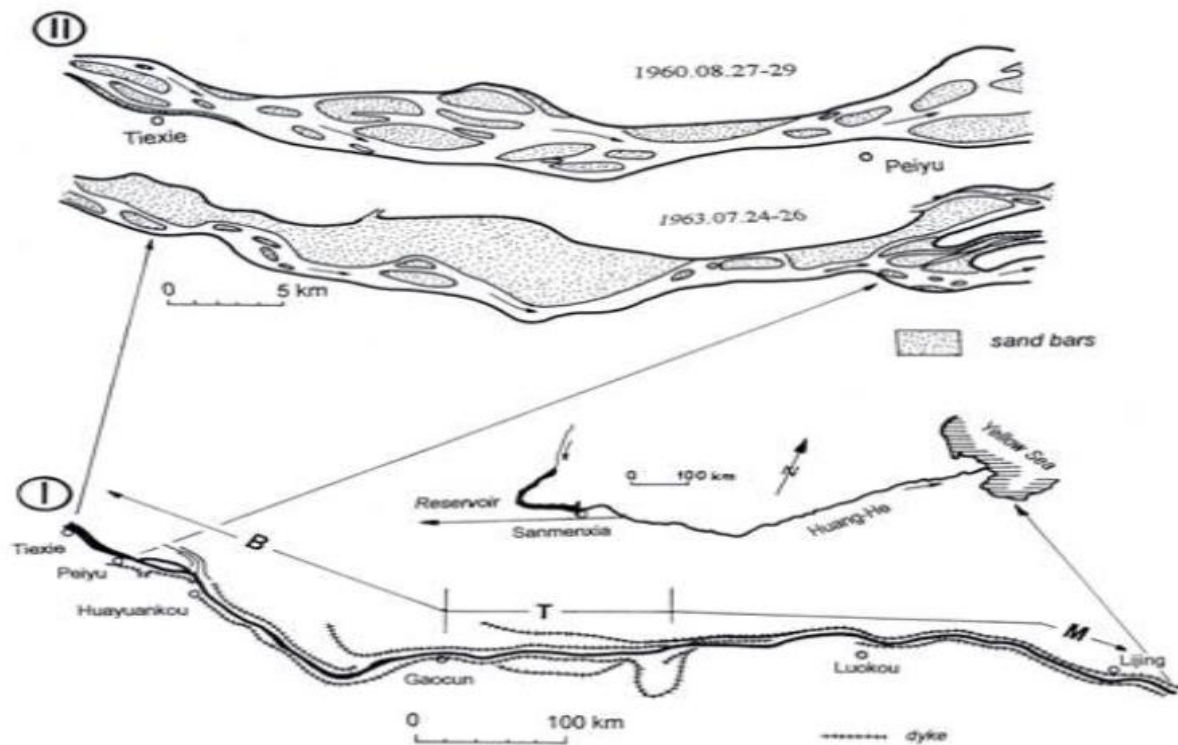


- **Trellis pattern-** this is where the tributaries join the main river at nearly 90 forming rectangular shapes e.g. river Tana and Mara in Kenya, river Charl in Chad and river Orange in South Africa.
- **Radial Pattern-** this is where rivers flow from the same source mainly a mountain top radiating to different directions. Thus the summit or mountain top is made up of a water shed or water catchment area e.g. river Siti, Koitobos.
- **Centripetal pattern-** this is where rivers and their tributaries discharge water into the same

basin originating from different directions common in areas surrounded by raised plateaux and highlands.

- **Parallel pattern-** this is where rivers flow adjacent to one another with neither the same origin (water shed/water catchment area) nor sharing tributaries but may discharge water into a bigger river or ocean/sea. This pattern is common in areas of hard rock structure or gentle flat lands e.g. river Lagh-tula, Chiraman, Galole into main Tana; Lagh-kifulu, Lagh-bar, Lagh-dera towards Somalia and Indian Ocean.
- **Braided pattern-** this is where a river experiences sediment deposition within the valley bed forming interweaving channels/streams separated by deposited sand, gravel, boulders, etc. The deposited material forces the water to erode the banks of the river creating a new flow way thus leaving behind long narrow bars of deposited sand and gravel with in the valley forming a braided channel.

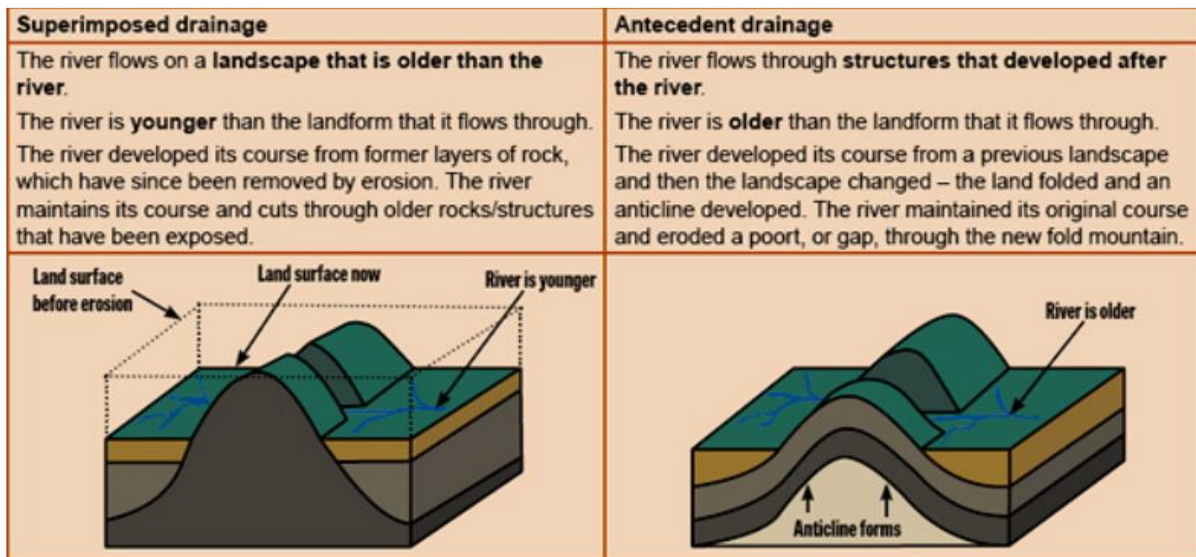
Illustration



- **Dendritic pattern-** this is where tributaries join a main river at nearly acute angles (less than 90) forming a branch-like or root-like shape e.g. river Niger in Nigeria, Nile in Sudan (White and Blue Nile), Congo in DRC, Zambezi in Zambia, etc
- **Antecedent pattern-** this is where a river flows in an area undergoing uplift creating raised land

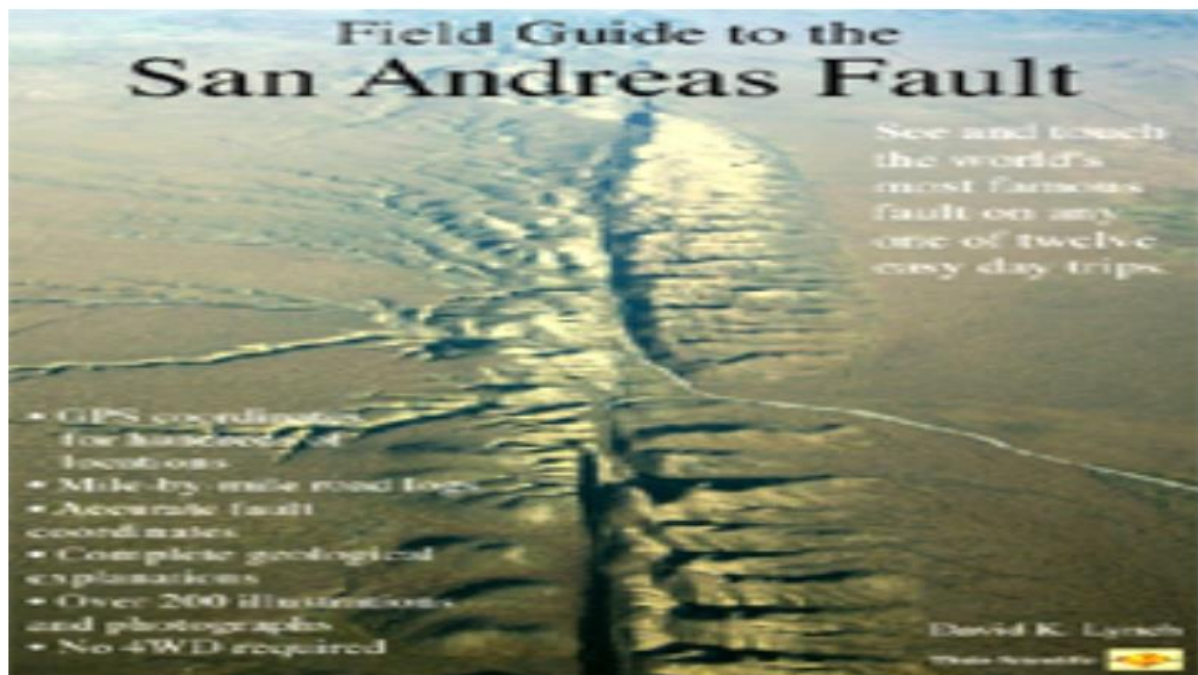
in one section of the river's course. This forces the down-streaming river to cut through the raised land giving rise to a narrow steep sided valley (gorge) e.g. river Gilgil, Malewa.

Illustration



- **Fault-guided pattern-** this is where a river flows through an area undergoing faulting which stretches across the river channel. This forces the river to divert its water flowing within the cracks or fault lines on the earth's surface thus a new fault guided river valley e.g. river Ewaso-nyiro in nguruman fault, Malewa in Soil-oolool fault.

Illustration



Importance of rivers

- Generation of hydro electricity along the waterfalls e.g. Victoria falls etc.
- Recreation like swimming, game fishing, rafting, etc
- Tourist attraction due to fauna and flora, rapids and falls, etc
- Water for domestic and industrial use
- Climate modification at micro level through evapo-transpiration
 - Navigation for passengers and goods
 - River banks have fertile alluvial soils for cultivation.e.g. in Egypt and Sudan.

- They provide water for irrigation in the dry areas, e.g. in Sudan for the Gezira Irrigation scheme, and Egypt.
- Source of food with proteins with marine animals i.e. fish.
- Mineral mining in the valley bed e.g. gold, petroleum, etc
- Habitat for wild aquatic animals and even around the river banks.
- Conservation of fauna and flora living within the river, at river banks and in the wetlands/swamps around the rivers.
- Research and study in hydrology, marine life, river-related features, etc.

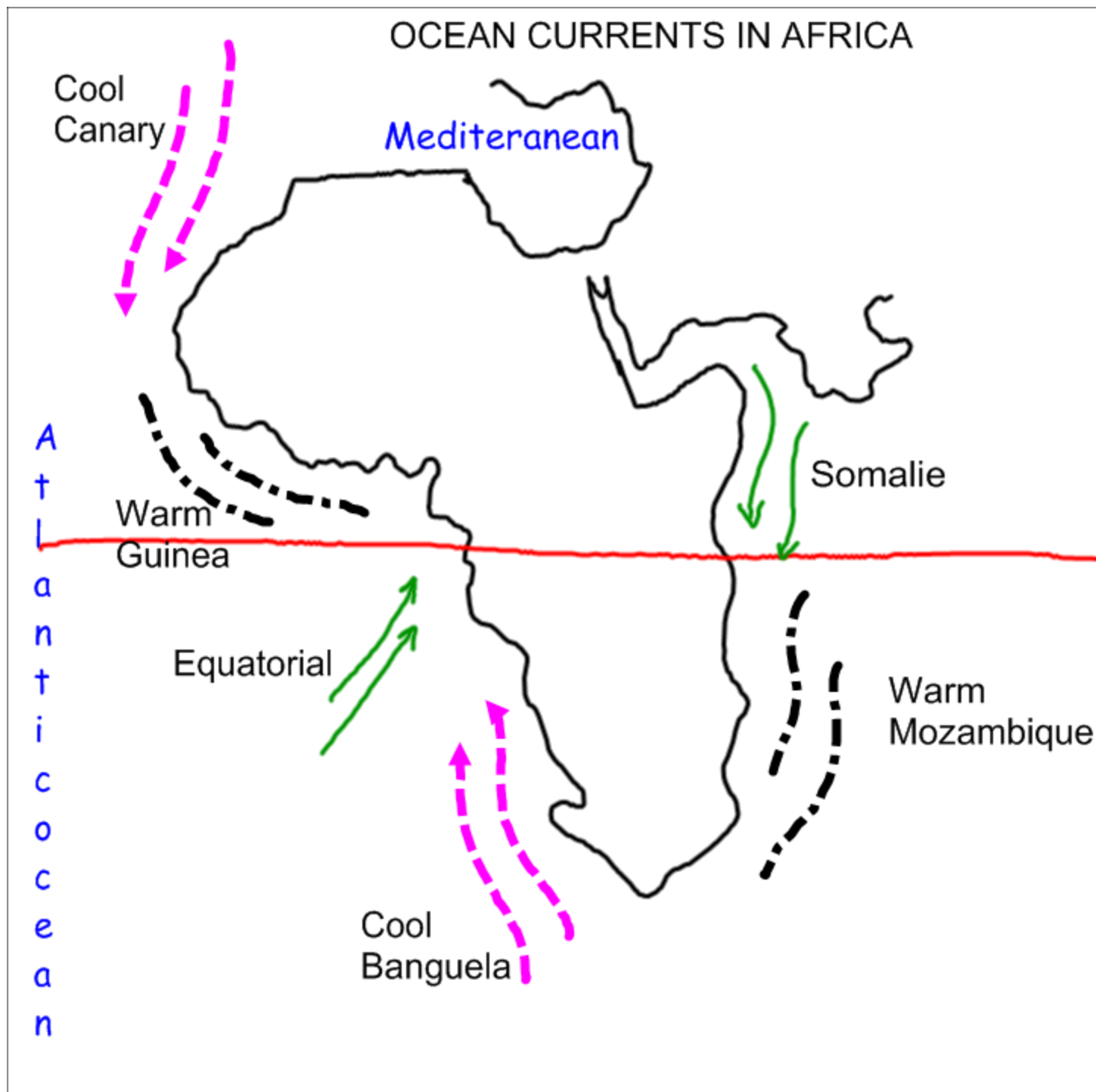
OCEAN CURRENTS

This is a mass of water flowing along the coastline of a given continental landmass either from the Equator to the Polar regions or from the Polar region to the Equator.

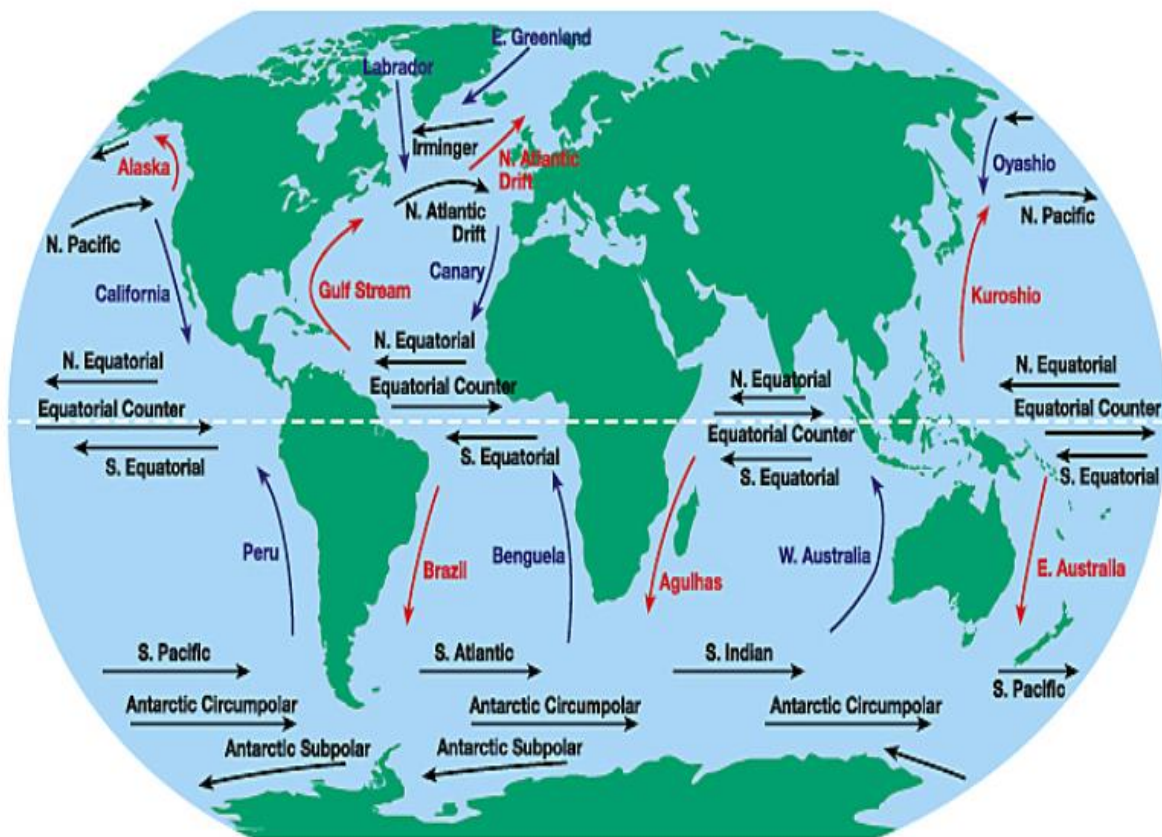
There are basically two types of ocean currents i.e. cool ocean current and warm ocean current.

- **Cool ocean currents** flow from the poles of the Polar regions of the northern and southern hemisphere towards the Equator in the Tropics e.g. the cool Canary from the north pole along the north western coastline of Africa and cool Benguela from the south pole along the south western coastline of Africa
- **Warm ocean currents** flow from the Equator in the Tropics towards the Polar regions of either the northern hemisphere or southern hemisphere e.g. warm Guinea from the Equator along the western coastline towards the North Pole and the warm Mozambique from the Equator along the eastern coastline towards the South Pole.

However, there exists the mild Equatorial current along the western coastline towards the Equator (a remnant of the cool Benguela current) and the Somali current from the Gulf of Aden, south of the Red sea towards the Equator.



Sketch map showing ocean currents



Characteristics

(a) Cool ocean currents

- Cold in nature
- Originate from the poles to the Tropics
- Carry cold conditions towards the areas they flow to e.g. northwest coast and southwest coast

Influence on climate

- Reduce on atmospheric temperatures of areas to which they flow e.g. Morocco and Mauritania
- Cause the cold desert effect where heavy moist air fails to evaporate so as to form convectional rainfall e.g. Namib/Kalahari desert in the south west

(b) Warm ocean currents

- Warm in nature
- Originate from the Tropics towards the north and south pole
- Carry warm conditions from the Equator toward the areas along which they flow e.g. west coast and southeast coast.

Influence on climate

- Increase in atmospheric temperatures of coastal areas e.g. Natal, Durban in south Africa, Maputo in Mozambique
- Bring about on-shore rainfall experience whereby warm moisture rises forming on-shore convectional rainfall on the eastern and western coastal areas

CLIMATE OF AFRICA

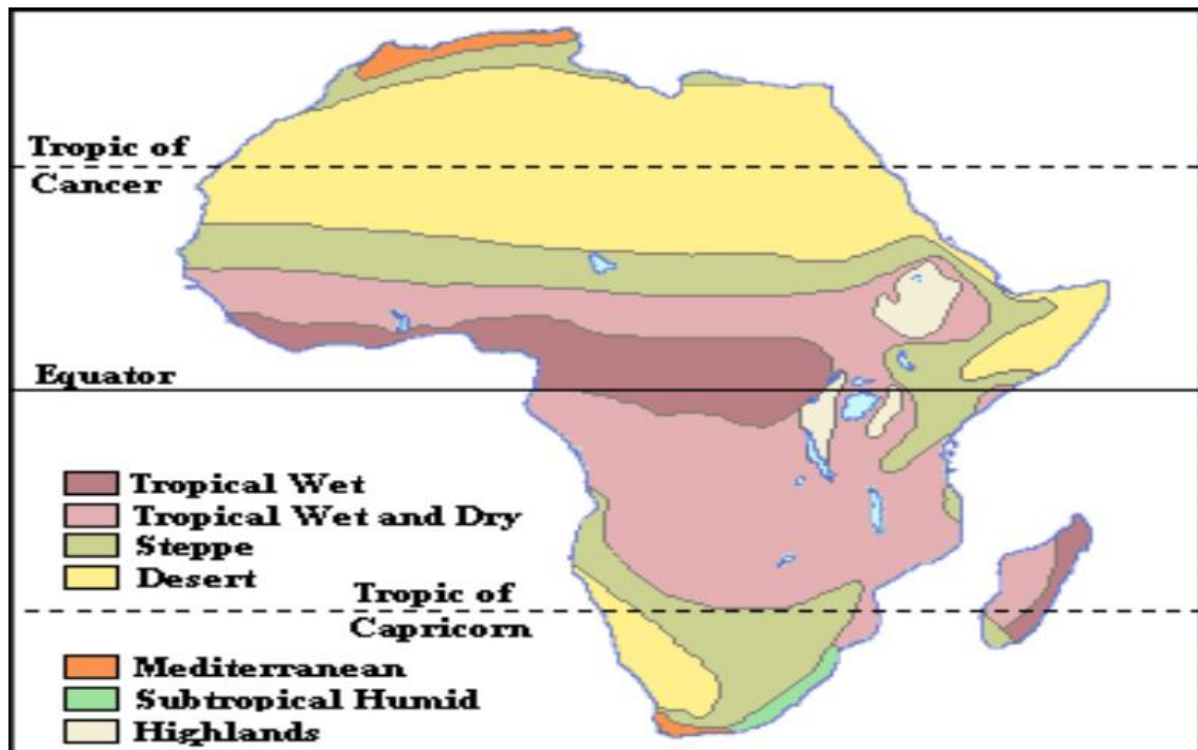
Climate is the average weather condition observed and recorded for a given region after a long period of time between 30 to 35 years e.g. desert, equatorial, Mediterranean, montanne, etc.

Weather is the daily atmospheric condition observed and recorded for a particular place at a given time e.g. sunny, rainy, windy, cloudy, etc.

Africa experiences a variety of climate patterns all the way from the north down south as well as from the west to the east e.g.

- Mediterranean
- Hot desert and semi-desert
- Tropical/ savanna
- Equatorial
- Tropical maritime
- Mountain/montanne
- Warm temperate continental

Sketch map showing climatic patterns



Factors influencing climate

- **Relief-** area with mountains and highlands tend to have cool wet climatic conditions due to the interference of moist laden winds that are forced to raise forming relief rainfall on the windward side and descending dry winds on the leeward side. On the other hand, plateaux and flat areas differ in climatic conditions due to lack of intercepting relief.
- **Aspect-** slopes that are directly facing the sun receive solar radiation tend to have high

temperatures unlike the other side in the shadow zone receiving low cool temperatures

- **Apparent movement** of the sun- this concerns the movement of the over head sun north or south of the equator forming a low pressure belt. On June 21st, the overhead sun in the north creates a vacuum attracting the northeast trade winds from the Arabian desert and southeast trade winds from the Indian Ocean giving rise to the inter-tropical convergence zone. This causes high temperatures with heavy rainfall in the northern hemisphere (summer conditions) and cool conditions in the southern hemisphere (winter condition). The reverse is true on 22nd December in the south.
- **Altitude-** areas near the sea level (0m) tend to experience very high temperatures due to absorption of solar radiation by the earth crust which is later reflected and scattered to the surrounding areas. Areas which are many meters above the sea level (1000m+) tend to have relatively cool climatic conditions due to moisture in the atmosphere and nearness to the

condensation level. This explains the cool climatic conditions in the highland or mountain areas

- **Vegetation cover-** areas which are highly vegetated or are having luxuriant vegetation tend to receive cool or mild or wet climatic conditions through evapo-transpiration where vapor is released into the atmosphere forming convectional rainfall. The reverse is true in areas with scanty vegetation or bare ground.
- **Distance** from large water bodies- areas near large lakes and seas/oceans experience wet climatic conditions due to the land and sea breeze effect. This is so because moisture from either land or lake/sea/ocean evaporates to form on-shore or off-shore rainfall which is not the case in areas which are far from water bodies (this only applies where other factors don't exist).
- **Latitudes-** areas which are near and those crossed by the equator tend to have wet climatic conditions with a double maxima (two rainfall

peaks) caused by the equinox when the overhead sun is directly above the equator on 21st march and 23rd September. The areas that are far from the equator have a single maxima (one rainfall peak) leading to relatively dry climatic conditions.

- **Prevailing winds-** Africa is influenced by two great trade winds i.e. the **Northeast trade** winds from the **Arabian desert** bringing with it dry conditions that explain the desert and semi-desert conditions in Somalia, Egypt, Sudan, Libya, Tunisia, etc plus the **southeast trade** winds from the **Indian ocean** bringing heavy moisture that explains the wet conditions in many parts of eastern Africa, Mozambique, Swaziland and south Africa.
- **Human activities-** practices engaged in by man affect the climate of an area on a micro and macro level. Activities like bush burning, deforestation, swamp reclamation, charcoal burning, etc destroys the vegetation cover and disorganizes the hydrological cycle and discharge of moisture into the atmosphere to

cause rainfall. The reverse is true in areas which are not tampered with by man.

- **Ocean currents-** these affect climate with respect to their origin e.g. the cool currents bring cool climatic conditions in the southwestern areas like Walvis bay, Namibia and northwest coast of Tunisia, Morocco, etc while the warm currents bring about warm climatic conditions causing convectional on-shore rainfall in those areas like Durban, Natal, Mozambique, Madagascar in the southeast and Tema, Accra, Lagos, port Harcourt, etc in the west.
- **Industrialization-** this concerns the discharge of dangerous gases into the atmosphere which affect the ozone layer that filters the dangerous sun rays like ultra-violet and infra-red that tend to increase atmospheric temperatures. Thus areas which are highly industrialized experience warm climatic conditions brought by the depletion of the ozone layer coupled with the emission of heat from industrial machines and vice versa where other factors are not dominant).

Influence of the Inter-Tropical Convergence Zone

The apparent movement of the overhead sun north or south of the equator brings about a geographical phenomenon referred to as the inter-tropical convergence zone concerning the movement of the great easterlies i.e. the northeast trade winds from the Arabian desert and southeast trade winds from the Indian Ocean.

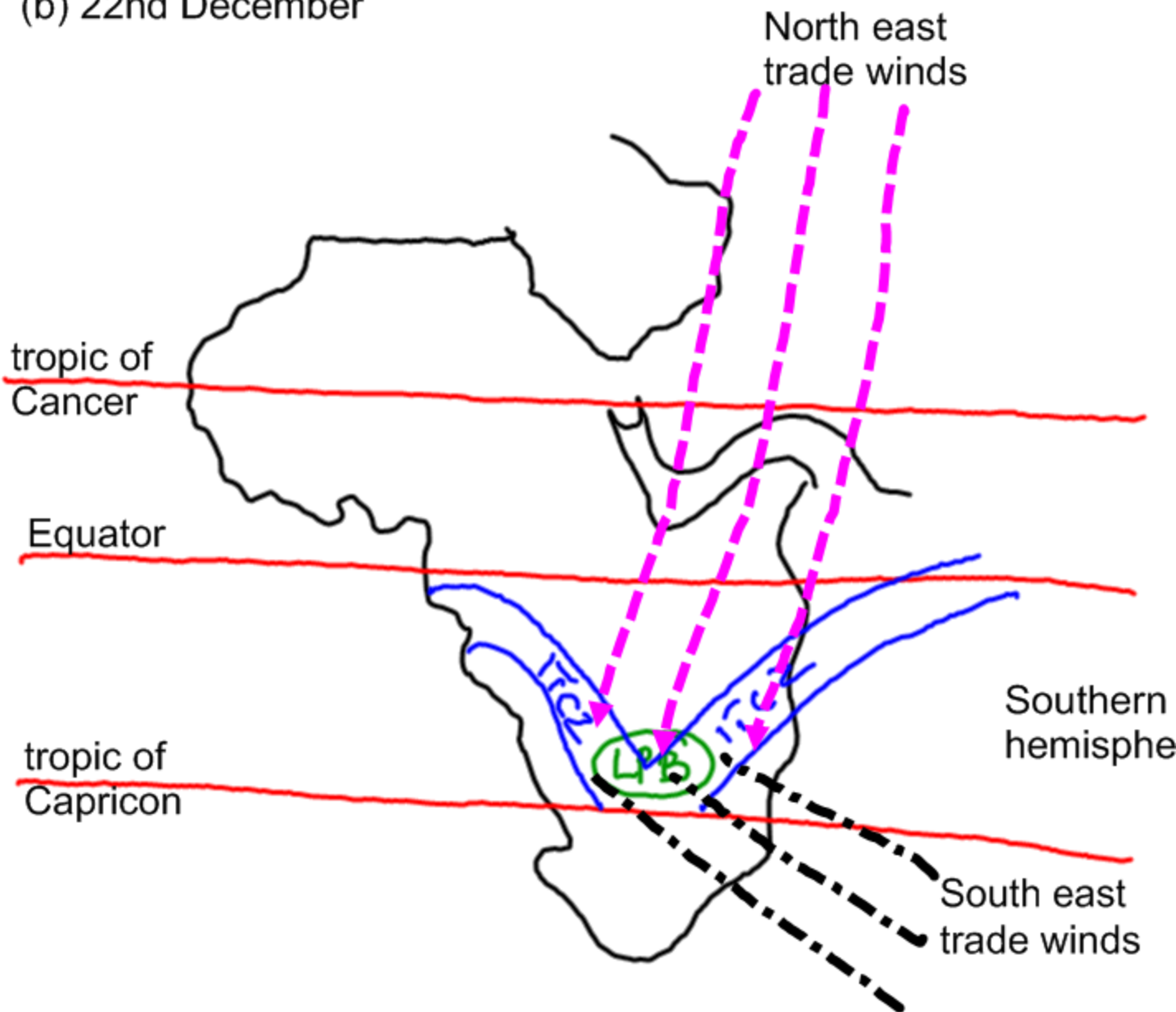
- **21st march and 23rd September-** this is when the overhead sun is directly above the equator leading to the equinox which brings about a double maxima (two rainfall peaks). Areas near and those crossed by the equator receive high temperatures and heavy convectional rainfall
- **21st June-** this is when the overhead sun is seemingly moving northwards near the Tropic of Cancer bringing about very hot temperatures that form a low pressure belt. This low pressure belt attracts the northeast trade winds from the Arabian desert and southeast trade winds from the Indian ocean north of the equator forming convectional rainfall. The north therefore will

have 'summer conditions' i.e. high temperatures with heavy rainfall while the south will have 'winter conditions' i.e. cool and wet.

- **22nd December-** this is when the overhead sun is seemingly moving south near the Tropic of Capricorn bringing about very hot temperatures that form a low pressure belt. This attracts the northeast and southeast trade winds south of the equator. This brings about high temperatures with heavy rainfall in the southern part of Africa except for the Mediterranean areas like Cape town influenced by the Benguela current.

Illustration (sketch map showing the ITCZ) on 22nd December.

(b) 22nd December



(a) 21st June

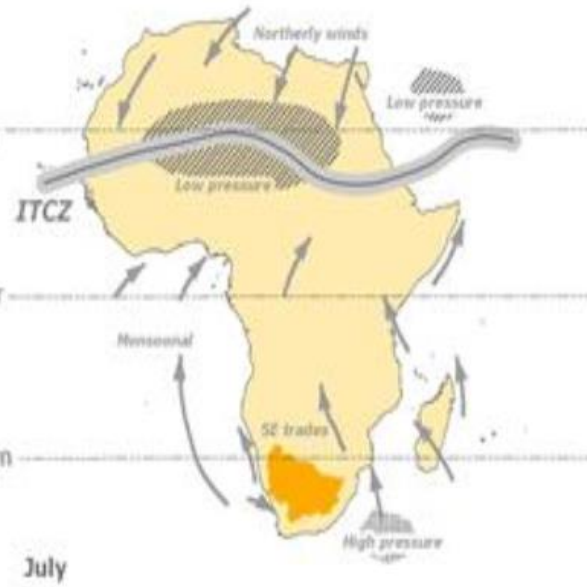
22nd

December

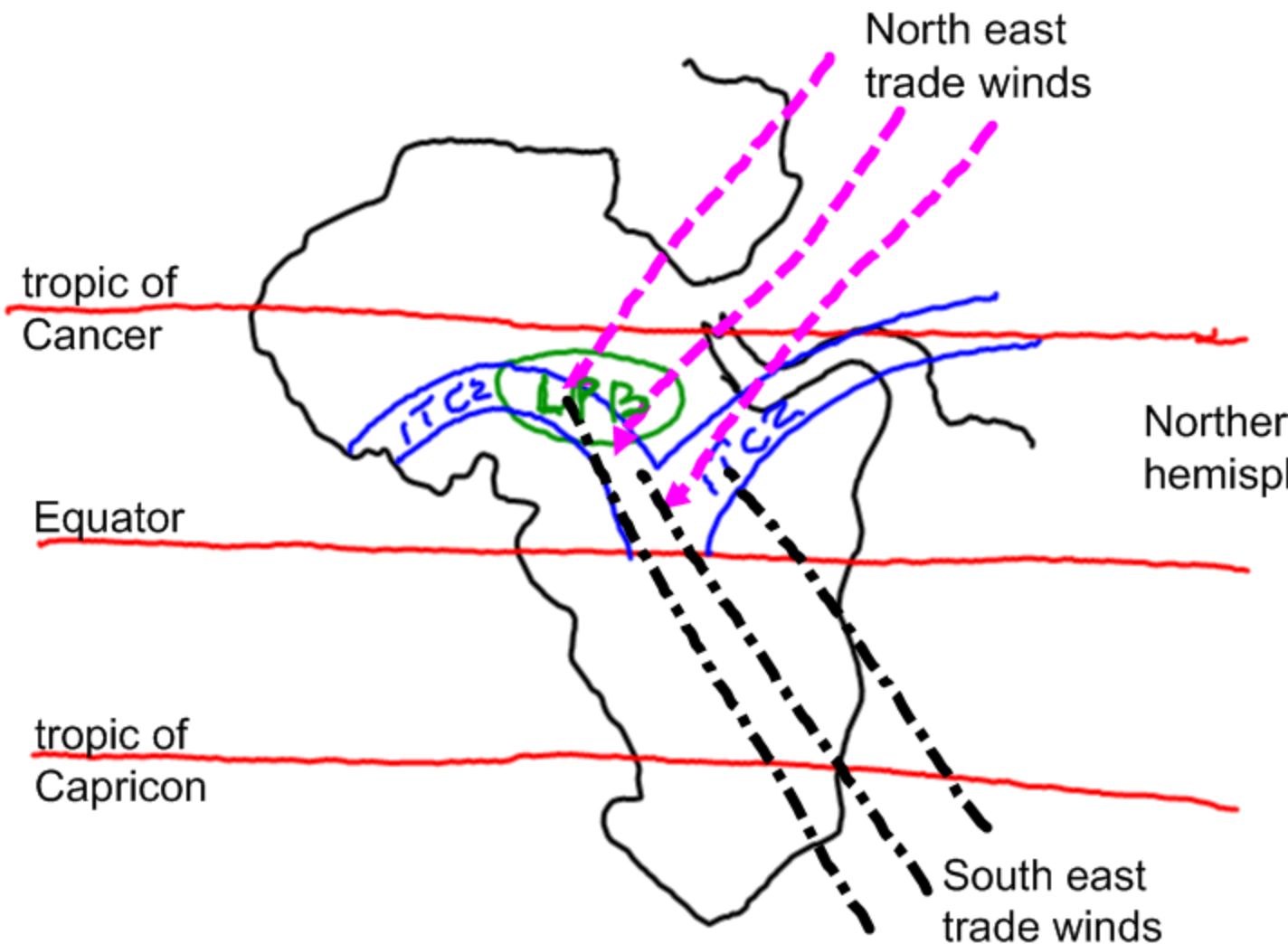
ITCZ position during wet season



ITCZ position during dry season



(a) 21st June



Key

ITCZ Inter Tropical Convergence Zone

LPB Low Pressure Belt

Effects of the Inter-Tropical Convergence Zone

- Brings about climatic subdivisions with respect to the apparent movement of the overhead sun i.e. if the overhead sun is in the north, it experiences ‘summer conditions’ while the south experiences ‘winter conditions’.
- Helps show rainfall patterns with respect to latitude i.e. areas near or crossed by the equator receive double maxima while those far from the equator receive a single maxima.
- Shows the direction of flow in the northeast and southeast trade winds which follow the low pressure belt created either in the north or south of the equator.

Climate types

As noted earlier, Africa experiences a variety of climatic patterns stretching from the north through the central to the south and from the west to the east.

Equatorial climate

This is experienced between 0° to 5° south and north of the equator particularly in the western part of Africa e.g. Nigeria, DRC, Cameroon, Gabon, Central African republic, etc. As for East Africa, it

receives modified equatorial climate influenced by the mountains and highlands.

Summary table

Month	J	F	M	A	M	J	J	A	S	O	N	D
Temp	23	23	23	22	22	22	21	22	22	22	22	23
Rainfall	40	70	150	230	205	115	65	80	195	225	150	50

Characteristics

- Receives rainfall throughout the year
- Has two rainfall peaks between March to May and September to November
- Rainfall totals range from 1500 mm and above
- Rainfall is convectional in nature due to hot temperatures causing evapo-transpiration
- Temperatures are relatively hot ranging between 21°C and 23°C evenly distributed throughout the year
- It has a small annual temperature range of approximately 2°C (23°C- 21°C=2°C)
- Experiences high humidity due to abundant vapour being discharged in the atmosphere throughout the year

Economic activities

- Agriculture e.g. cocoa in Ghana, palm oil in Nigeria, rubber in Liberia, sugar cane and banana in DRC due to heavy rainfall.
- Fishing e.g. river Congo in DRC, river Niger in Nigeria, etc due to heavy rainfall that fills the water bodies.
- Forestry and forest conservation in Cameroon, DRC and Gabon due to the rain that support tree growth
- Lumbering due to abundant flora e.g. in Gabon, DRC, etc
- Tourism due to abundant fauna and flora
- Wild life conservation due to abundant fauna and flora
- Mining of oil in Nigeria, gold and uranium in DRC, etc
- Educational research and study in botany, zoology, etc
- Hunting of wild game in the forests.

Likely problems

- Pests, disease vectors and man eaters

- Seasonal flooding due to heavy rains
- Difficulty in construction of transport and communication networks due to dense vegetation diverse drainage and heavy rainfall.
- Landslides, mud flows and rock fall in mountainous areas due to water infiltration coupled with gravitational pull
- Soil erosion on steep slopes and plains with bare ground
- Soil infertility caused by leaching where soil nutrients are dissolved vertically and horizontally

Tropical climate

This is experienced between 5° to 15° north of the equator extending to 23° south of the equator. This stretches from West Africa through east and central to southern Africa.

It is sometimes referred to as Savanna or Sudan climate and the most extensively experienced in Africa.

Summary table

Mont	J	F	M	A	M	J	J	A	S	O	N	D
------	---	---	---	---	---	---	---	---	---	---	---	---

h												
Temp	22	23	22	2	2	1	1	1	2	2	24	24
				1	0	8	7	8	0	3		
R'fall	25	17	10	2	2	0	0	0	0	5	10	17
	0	5	0	5	0	0	0	0	0	0	0	5

Characteristics

- Receives two distinct climatic seasons i.e. wet season from October to march and dry season from June to September
- Day times are always very hot while the nights are cold
- Rainfall totals are approximately 860 mm per annum
- Rainfall is convectional in nature due to the hot temperatures especially in ‘summer’
- Temperatures are relatively hot ranging between 17°C and 24°C
- Annual temperature range varies from 4°C to 9°C
- Rainfall is received mainly in ‘summer’ while the ‘winters’ are dry
- Rainfall is unevenly distributed

Economic activities

- Agriculture especially annual crops like beans, groundnuts, etc
- Hunting due to abundant fauna
- Livestock farming due to abundant flora.
- Charcoal burning due to abundant flora(woodland)
- Bee keeping due to abundant pollination of the flora.
- Tourism due to abundant fauna and flora in the grass land
- Mineral mining e.g. gold in Mwadui- Tanzania and Witwatersrand- South Africa
- Wild life conservation in national parks and game reserves
- Educational research and study in zoology.

Likely problems

- Unreliable rainfall limiting agriculture i.e. the rainfall received is only 860mm per annum, that doesn't allow them to grow perennial apart from annual crops.
- Occasional wild fires due to friction of dry leaves and branches

- Occurrence of pests and disease vectors together with man eaters
- Soil erosion due to limited vegetation and bare ground.
- Over grazing arising from over stocking

Mediterranean climate

This is experienced in the northern extreme of Africa in Morocco, Tunisia, Algeria and extreme south particularly Cape Town in South Africa.

Summary table

Month	J	F	M	A	M	J	J	A	S	O	N	D
Temp	21	20	20	17	15	13	12	11	10	9	8	7
R'fall	12	12	15	50	90	110	87	87	50	35	20	15

Characteristics

- Has four distinct climatic seasons i.e. spring, summer, autumn and winter
- Rainfall totals range between 500 to 1000 mm per annum

- Occurrence of fog due to heavy moisture brought by the cool Benguela current failing to evaporate to form convectional rainfall
- ‘Summers’ are relatively hot and dry while the ‘winters’ are cold and wet.
- Summers are generally sunny

Economic activities

- Agriculture especially fruits and cereals like apples, orchards, citrus fruits, barley, wheat, etc
- Tourism due to the climatic conditions like those in Europe
- Marine fishing near the coast of Atlantic ocean for whales and sharks
- Animal rearing e.g. merino sheep for wool and mutton, cows for milk and beef
- Forestry and forest conservation
- Mineral mining at small scale like tin and copper in south Africa

Likely problems

- Occasional fog causing difficulty in visibility
- Temperatures in ‘winter’ tend to be very low causing severe coldness

- Sometimes the ‘summers’ get very dry affecting grazing and cultivation

Hot desert and Semi desert climate

This is experienced in the tropical belt of North Africa i.e. Sahara desert, and the Mediterranean coastal lands i.e. Kalahari and Namib deserts of southwest Africa.

Africa has two categories of deserts i.e.

Marine deserts- those next to large water bodies influenced by cold ocean currents like the Namib desert in southwest Africa

Continental deserts- those found in the interior of the continental mass like the Sahara desert in the north and Kalahari desert in the southern section.

Summary table

Month	J	F	M	A	M	J	J	A	S	O	N	D
Temp	12	15	20	25	30	35	37	36	33	26	20	16
R'fall	00	00	03	10	10	35	85	50	13	12	00	00

Characteristics

- Rainfall totals range between 250mm and 650mm which sometimes reduces
- Occurrence of strong winds in form of desert storms
- Little and unreliable rainfall affecting human activities
- Clear sky with little or no cloud cover due to limited humidity
- Rainfall is received in thunder form during the hottest part of the year
- Temperatures between day and night have a remarkable range which is high
- Dominated by sandy soils
- Bare ground with scattered vegetation

Economic activities

- Tourism due to the hot conditions good for the temperate people
- Desert sports e.g. motor rallying and motorcycling
- Filming due to the brightness of the environment for easy scene capturing
- Nomadic pastoralism like the Fulani and Tuaregs of north Africa

- Irrigation farming like the Gezira scheme of cotton in Sudan along the Nile and Richard Toll scheme in Senegal along R.Senegal.

Likely problems

- Limited open surface water due to high evaporation rates
- Prolonged drought as evident in the table i.e. dry spell
- Deadly fauna like scorpions, poisonous snakes, etc
- Airborne diseases due to dryness, storms, etc
- Infertile sandy soils affecting agriculture

Tropical Maritime climate

This is experienced in the coastal areas of eastern Africa stretching from Kenya, Tanzania and Mozambique influenced by the southeast trade winds (monsoon wind) and the warm Mozambique ocean current

Characteristics

- Generally warm , a little humid and evenly hot

- Rainfall is received throughout the year due to the warm ocean current and south easterlies causing on-shore rainfall
- Occurrence of tropical cyclones giving rise to the cyclonic rainfall
- Temperatures are generally hot i.e. 25°C and above

Economic activities

- Tourism due to the warm conditions attracting the temperate dwellers
- Commercial crop cultivation like sisal, cloves, coconuts, etc
- Marine fishing at the shores of the ocean
- Trade and industrialization at major ports like Mombasa in Kenya, Dar-es-salaam in Tanzania, Maputo and Beira in Mozambique
- Recreation i.e. leisure and entertainment at different beaches.
- Education research and study on coastal geomorphology and marine life
- Filming by the music industry due to the beautiful beach scenery

Warm Temperate climate

This is experienced only in South Africa particularly in the Veld region (Natal province). The climate belt is bordered by the Mediterranean in the west and the Tropical Savanna in the north.

Characteristics

- Warm and humid ‘summers’ with dry ‘winters’
- Temperatures range from 10°C in ‘winter’ to 25°C in ‘summer’
- Rainfall totals range from 500mm to 700mm per annum
- High evaporation rate especially in ‘summer’ due to the high temperatures

Economic activities

- Tourism due to the mild conditions attracting temperate dwellers
- Viticulture/market gardening/dry farming involving growing of fruits and vegetables
- Plantation farming for wheat and sugarcane in Natal
- Industrialization basically agro-based
- Elementary mining of tin, copper etc

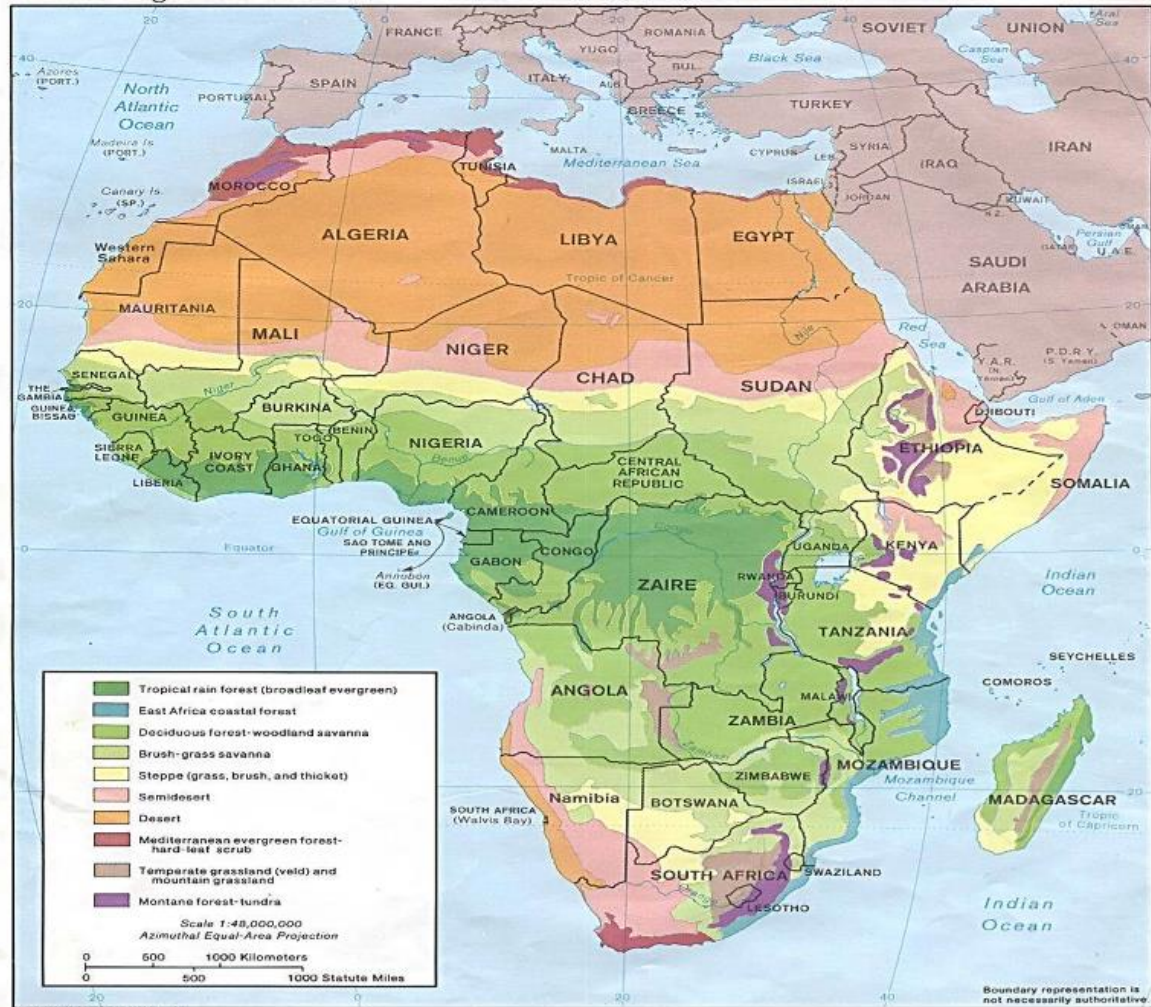
VEGETATION IN AFRICA.

Vegetation is the natural plant cover in man's visible environment either on the surface of the earth (continental crust) or under water bodies i.e. river bed, lake bed or sea bed (oceanic crust).

Africa is blessed with a variety of vegetation cover from the north to the south and from the west to the east e.g. Mediterranean, desert, savanna grassland/woodland, equatorial/tropical rain forest, mangrove/swamp, mountain/montanne, temperate, etc.

Sketch map showing vegetation distribution

Natural Vegetation in Africa



Factors determining vegetation distribution

The present day man-made and natural vegetation in Africa is attributed to the following factors i.e. altitude, relief, climate, soil texture and biotic factors

- **Altitude-** this refers to the change in atmospheric temperatures above the mean sea level. Height above sea level brings about climatic conditions that influence growth of different vegetation

types, this is common in mountainous or highland areas with savanna, tropical forests, bamboo, heath and moorland plus bare rock at the peak

- **Relief-** this refers to the nature or gradient of the landscape being flat, gentle or steep. The gradient favors growth of vegetation with respect to height, size and root makeup. The relatively flat land is dominated by forests and grassland while the gentle sloping land is covered with grassland and scattered trees. As for the very steep land, it's covered with grass having very short roots. However some mountainous areas have dense vegetation like the Drakensburg, Elgon, Cameroon, etc.
- **Climate-** this concern the temperatures and rainfall received in a given region. Climate determines the dominant vegetation cover and tree species that survives in a given area. E.g. high temperatures with very little rainfall favor desert vegetation having thickets, scanty trees while hot temperatures with heavy rainfall favors tropical rain forests.

- **Soil texture-** the nature of soil in a given region influences the type of vegetation and tree species i.e. very steep areas with thin soils support very short trees and grass while gently sloping or flat lands with deep fertile soils support very tall trees with deep roots though even grass does well in loam soil.
- **Biotic factor-** this concerns the work of humans, animals, insects and bacteria e.g. man/woman, elephants, caterpillars, termites, etc. As for man he influences vegetation by either conserving the natural vegetation, planting man-made forest belts of pine trees and eucalyptus, reclaiming swamps, deforestation, bush burning, etc. On the other hand, animals can destroy vegetation by eating it or simply destroying it like monkeys and elephants; insects like caterpillars, locust/grass hoppers, termites also destroy vegetation.

Types of Vegetation

As noted, Africa has a variety of vegetation cover due to the different soil types, drainage, relief, etc as can be seen below

Equatorial/ Tropical rainforest

This is dominant in West Africa in Gabon, Cameroon, DRC and Central African republic, Congo Brazaville, Equatorial Guinea though patches exist in Uganda and Kenya mainly in areas near the equator. This vegetation cover is found in the equatorial climate belt with hot temperatures and heavy rainfall. The tree species include mahogany, ebony, okoume, ‘mvule’, etc

Characteristics

- Ever green due to the abundant rainfall received
- Have broad leaves for photosynthesis
- Have a great height of 30 to 50 m
- Develop a straight posture due to competition for sun light
- Do not occur in a pure stand
- Have buttress roots due to big size and great height
- Have little or no under growth due to limited sunlight for photosynthesis

- Have hard wood
- Form a thick canopy of three layers

Economic activities

- Lumbering due to abundant flora
- Tourism due to abundant fauna and flora
- Hunting due to abundant fauna
- Agriculture at the periphery or border of the forests
- Fruit and food gathering of wild fruits and tubers
- Academic research and study in zoology, botany, etc
- Wild life conservation
- Forestry and forest conservation of extinct species
- Leisure and entertainment
- Fishing since they act as water catchment areas
- Bee keeping
- Filming

Mediterranean

This is located in the northern extreme of Africa in Algeria, Tunisia, parts of Libya and the southern

extreme in South Africa particularly Cape town.
Tree species include pine, oaks, etc

Characteristics

- Trees are scattered
- Do not occur in a pure stand i.e. a mix of pine and oak
- Develop long roots
- Have a considerable height of above 15m
- Have little under growth
- Have fleshy bulb roots for water storage
- Leaves are waxy and shiny to reduce water loss

Economic activities

- Tourism due to abundant fauna and flora
- Lumbering of pine trees
- Arable farming especially horticulture or viticulture
- Animal husbandry of cattle, sheep, goats
- Academic research and study
- Leisure and entertainment
- Sport hunting especially by the tourists

Savannah

This is very extensive from the western part of Senegal through the central like Cameroon and DRC to the eastern like Uganda, Kenya towards the south like Botswana and South Africa. It is sub-divided into;

- Savannah grassland- dominating the Central, Eastern and Southern parts.
- Savannah woodland- particularly in the northern part of Tanzania called Miombo woodlands. Tree species include baobabs, spear grass, cactus, etc,

Characteristics

- Trees are scattered
- Have a relative height of 2 m
- Do not occur in a pure stand
- Leaves are green during the rain season and turn yellow-brown in the dry season
- Dominated by grassland
- Most trees shed off their leaves during the dry season to avoid water loss i.e. deciduous trees
- Trees are of hard wood

- Develop an umbrella shape as branches spread out with small stalks

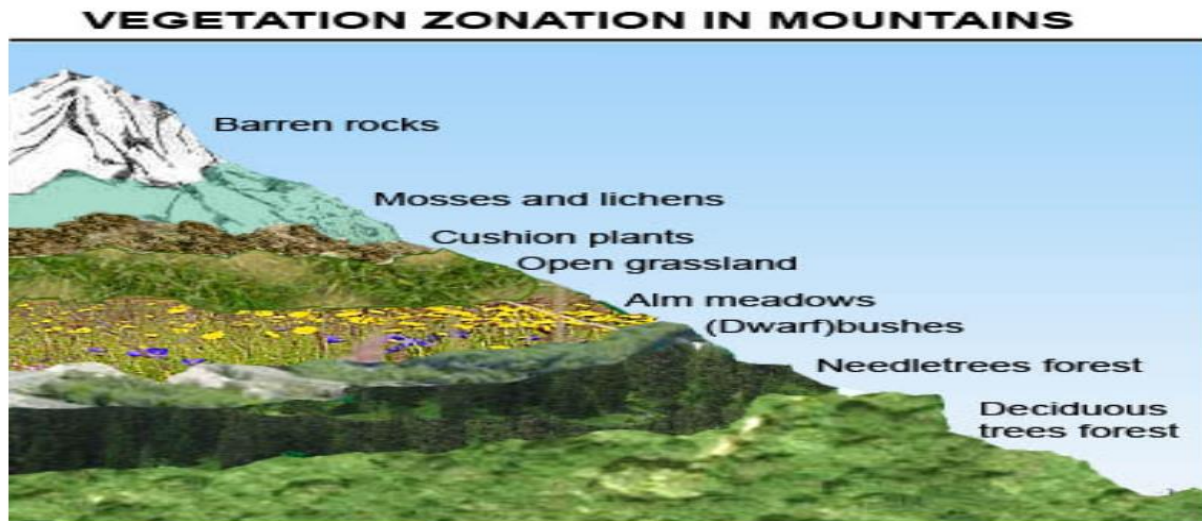
Economic activities

- Animal husbandry due to abundant grassland
- Crop cultivation due to extensive relatively flat land
- Tourism due to abundant fauna and flora
- Wild life conservation
- Hunting due to abundant fauna
- Academic research and study
- Industrialization due to extensive land
- Trade and commerce coupled with transportation
- Settlement

Mountain/Montanne

This is found mainly in mountainous and highland areas where altitude influences change in rainfall and temperature patterns giving rise to different vegetation types at different levels above the sea level from the foot of the mountain to the peak.

Illustration



Characteristics

- Does not have specific characteristics due to the variety of vegetation but leaf can be borrowed from Savannah, Tropical rainforest and Alpine vegetation

Economic activities

- Tourism due to abundant fauna and flora
- Crop cultivation on the gentle slopes and foothills of mountains /highlands
- Animal husbandry on the foothills due to grassland
- Hunting due to abundant fauna
- Academic research and study
- Fruit and food gathering in the forests.

- Wild life conservation
- Forestry and forest conservation
- Lumbering e.g. in the tropical forest zone
- Settlement at the foothills

Desert

This is wide spread in the northern part of Africa referred to as the Sahel region and in the southwest part called Namib/ Kalahari region. Tree species include cacti, coarse grass, etc.

Characteristics

- Very short trees made of shrubs, thickets and thorny bushes
- Have needle like leaves to reduce water loss
- Have waxy leaves to reflect sunlight and regulate transpiration
- Have thin stems with thick barks to reduce water loss
- Some trees develop thorns on their barks to reduce water loss.
- Have very deep roots to access water underneath/from underground.

Economic activities

- Tourism in terms of sun bathing and desert travel
- Animal husbandry especially nomadic pastoralism
- Leisure and recreation like desert rallying
- Mineral mining of oil, gold, etc
- Wild life conservation of desert fauna like scorpions, snakes, tortoise, etc
- Filming due to the bright environment i.e the clear blue sky.
- Agriculture especially irrigation farming in Egypt, Sudan, Senegal, etc in those areas that are located along major rivers.e.g the Nile in Sudan and Egypt,R.Senegal in Senegal.

Temperate/ Veld

This is found only in South Africa in the provinces of Natal, TransVaal and the Orange Free state partly Lesotho. It comprises of grassland, flowers and shrubs.

Characteristics

- It shares with the savannah grass land

Economic activities

- Crop cultivation e.g. sugarcane and wheat in Natal
- Fruit and flower growing/horticulture and viticulture.
- Animal husbandry of merino sheep for wool and mutton
- Tourism due to abundant fauna and flora
- Industrialization based on agriculture

POPULATION IN AFRICA

Population in the general sense refers to the total number of living and non-living phenomena in geographical space at a specific time. As for humans, it refers to the total number of people living in an area at a given period of time.

Africa has diverse population patterns i.e. dense, medium and low that is unevenly distributed throughout the continent.

The population of Africa is estimated at 1.111,000,000 with some countries being densely populated like Nigeria, Egypt and South Africa

while others are sparsely populated like Equatorial Guinea, Djibouti and Burundi.

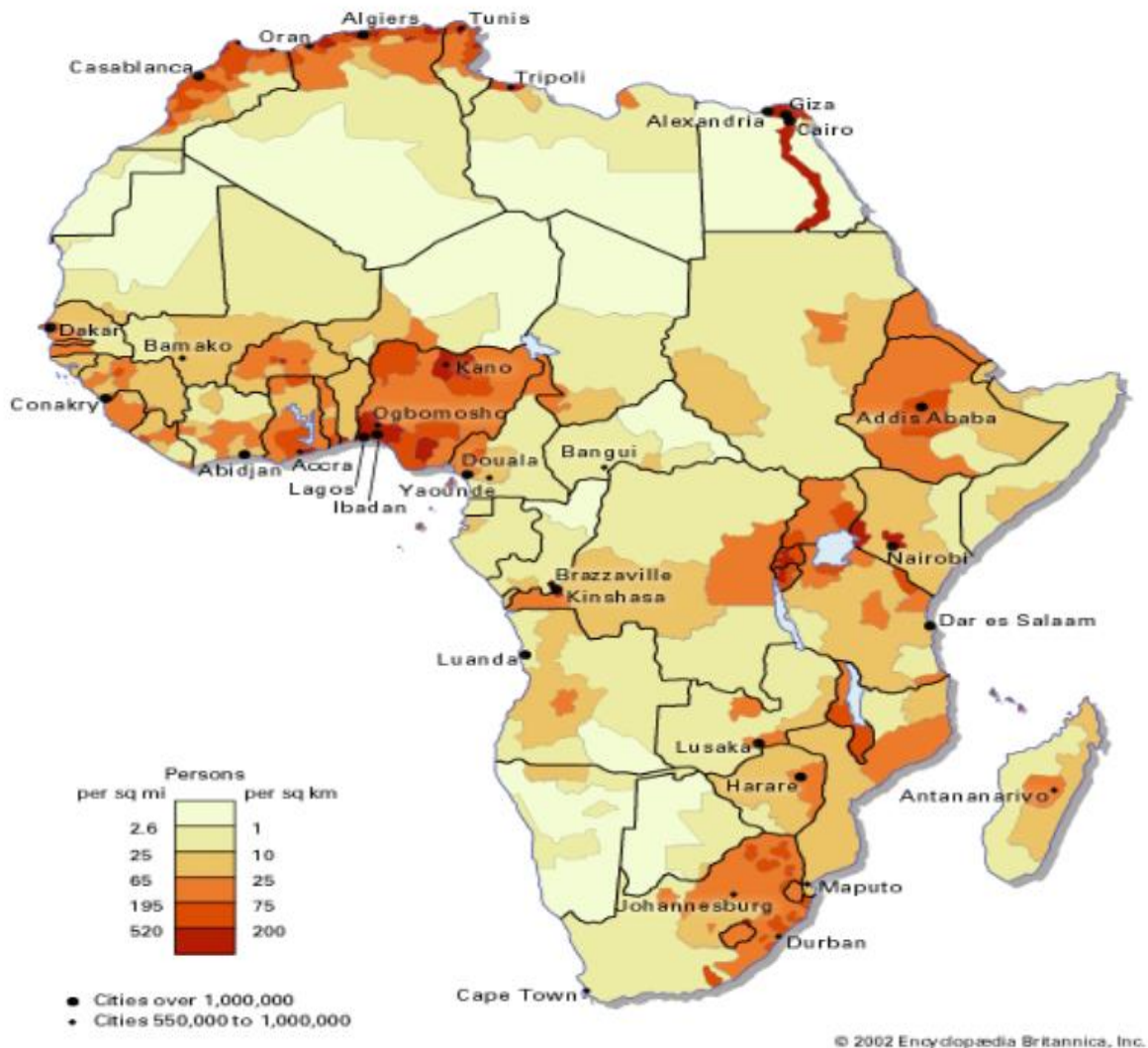
Africa accounts for 15% of the world's population, having the growth rate of 92.293 million people per annum.

Population terms

- Population distribution- the number of people in a place at a given time.
- Population density- the number of people in a given place at a given time per square kilometer.
 $PD = \text{no. of people} / \text{area}$
- Birth rate- number of live births per a 1000 people in an area per year.
 $BR = \text{no. of live births} / 1000$
- Death rate- the number of deaths per a 1000 people in an area per year.
 $DR = \text{no. of deaths} / 1000$
- Natural increase- the difference between the death rate and the birth rate
 $NI = BR - DR$
- Growth rate- the natural increase in population size of an area in a specified period of time.
 $GR = \text{current population} - \text{previous population}$

- Dependency ratio- the ratio of the productive population (15-65) to the economically non-productive population (0-14 and above 65)
- Migration- the transfer of persons from one geographical location to another either temporarily or permanently. E.g. RUM, URM, RRM, UUM, emigration, immigration, etc.

Sketch map showing population



Factors favoring population distribution

- Nature of vegetation- either can be easily cleared like savannah for agriculture and settlement or is hardly cut like tropical rainforest with hard wood.

- Nature of landscape- either being very steep that are rarely inhabited, gently sloping or flat attracts population thus densely inhabited
- Women fertility rate- possibility of the number of children to be born by a woman in her reproductive life time
- Climatic conditions- either being conducive for settlement like tropical, equatorial or harsh conditions like desert
- Political atmosphere- either being politically stable attracting population or war zone areas being sparsely inhabited
- Economic activities- either having viable trade and employment opportunities attracting people in an area or non-economical forcing people to seek for better standards of living
- Social service delivery- either well served with education, health, banking, transportation, recreation, etc attracting many people or having limited/none to meet the increasing demand
- Open surface water- either having diverse rivers and lakes attracting many people or having few water sources or none having sparse population
- Mortality rate- either having a low death rate implying high population due to high life

expectance and immunity against disease or having a high death rate implying low life expectancy thus low population.

- Morbidity or disease prevalence- either free from disease vectors with low sickness level attracting population or being prone to disease vectors compelling people to move to new areas leaving the former non-inhabited
- Soil fertility- either having deep fertile cultivable soils favoring agriculture and settlement or very infertile sandy soils limiting cultivation which is the basic livelihood of most people on the continent
- Extensive land- either free and not inhabited thus attracting people or already inhabited by wild animals, other humans and vegetated
- Migratory patterns- either undergoing RUM,RRM,UUM, emigration, immigration, and URM hence, causing variation in population
- Government policy- either supporting high birth rates together with RUM, URM, RRM, UUM, emigration and immigration or limiting immigration, RRM,RUM, URM, UUM and regulating number of children to be born

- Natural occurrences- either being prone to floods, earthquakes, landslides, mudflows, drought and famine hence discouraging settlement or being free from such calamities hence encouraging settlement.
- Cultural practice- either promoting polygamy and polyandry favoring increase in population or being conservative with monogamy
- Religion- either promoting polygamy and unlimited child bearing or supporting monogamy
- Accessibility- either it is very accessible with reliable transport and communication networks and social service delivery hence attracting settlement or very remote causing fear among the population.
- Historical activities- either areas engaged in slave trade, long distance trade, or any other that might have compelled people to move away or those less affected and benefited especially towns and collection centers like the East African and the West African coasts hence having dense population.
- Growth of ancient kingdoms- either inhabited by civilized and well organized centralized kingdoms like the Chwezi, Bunyoro-Kitara, Kanem-Bornu,

Yoruba states or areas inhabited by primitive segmentary societies like the Khoi-San, Bamba /Ba-Konjo/Batwa, etc

High population distribution

This is a situation where an area has a high number of people coupled with a high growth rate and population density compared to the sustainable capacity of the land. This is attributed to a number of factors as seen above, and has the following advantages as explained below;

Advantages

- Abundant labor force to engage in the production process
- Better security of the country
- Ready market for fresh and manufactured goods
- Innovation, creativity, discovery and research in science and technology
- Urban development due to increasing population demanding basic infrastructure and social service delivery
- Utilization of natural resources and land inclusive for agriculture, tourism, etc

- Encourages high food production in the area since labor is present.
- Industrial development especially of labor-intensive nature
- Easy movement of ideas and mobilization of the masses
- Favors unity of the masses due to socialization
- Economic diversification of the economy dealing in a variety of potential activities
- Promotes international relations through trade and labor exchange

Disadvantages

- High crime rate due to idleness
- High levels of unemployment
- High government expenditure in providing social services
- Slum development due to congestion
- Easy spread of airborne and sexually transmitted diseases.
- High levels of poverty and poor living standards
- Over utilization of natural resources
- High cost of living due to limited survival means
- Traffic congestion in urban and industrial areas

- Land fragmentation in congested areas
- High rate of dependence on the working population
- Promotes rural-urban migration in search for better living standards
- Moral decadence due to a mix of people from all walks of life
- Dependence on other countries for aid
- Dumping of industrial rejects due to high levels of poverty
- Difficult for the government to plan and implement national programs

Low population distribution

This is where the population is far below the sustainable capacity of natural resources coupled with a low growth rate and population density.

Advantages

- Easy to monitor and govern
- Easy planning and implementation of national programs
- Less strain on social amenities and service access

- Low occurrence of crime
- Low risk of disease spread
- Less government expenditure in providing social services to the people
- Low congestion in inhabited areas
- Low cost of living as people seem to have the basics of life

Disadvantages

- Shortage of labor either skilled, semi or non-skilled
- Low tax base for the government
- Limited market for agricultural and manufactured items
- Low infrastructure development due to low expected returns
- High vulnerability to insecurity since the population is low and can not stand against a strong external military force.
- Many resources remain redundant
- Low creativity, innovation, etc
- Low urbanization

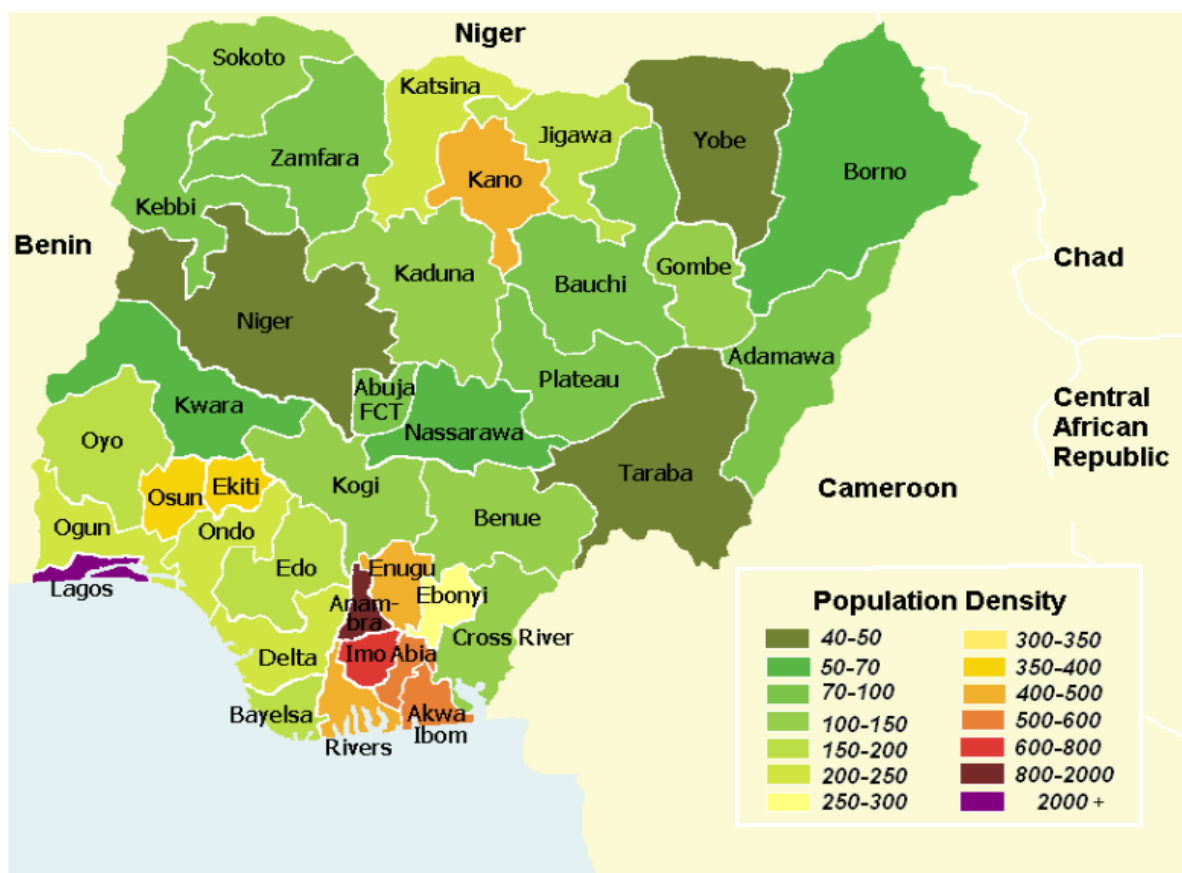
- Prevailing of primitive cultural practices due to conservatism

Population studies in Nigeria

Nigeria is the most populated country in Africa having 1/6 of Africa's population with 389 ethnic groups like Hausa-Fulani, Nupe, Tiv, and Kanuri speaking a variety of languages like Hausa, Yoruba, Igbo, Fulani, Ijaw and English.

The population of Nigeria stands at 149,229,090 with a population density of 1612 people, a growth rate of 1.999%, a birth rate of 36.65/1000, and fertility rate of 4.82/woman and a life expectancy of 46.94 years.

Sketch map showing population distribution in Nigeria



Summary table

Age group	Percentage	Male	Female
0-14	41.5	31,624,050	30,242,637
15-64	55.55	42,240,641	40,566,672
65+	3.1	2,211,840	2,343,250

Factors for population distribution

- The general relief- the most inhabited areas are the plateaux, coastal low lands, river valleys where agriculture and settlement is possible.
- Climate- being a mix of tropical savanna in the central, equatorial in the south and desert in the north
- Soils- the sandy soils in the north, alluvial soils in the valley areas and coastal lowlands with deltas
- Vegetation- the desert vegetation in the north has discouraged settlement savannah in the east, equatorial vegetation in the west and south
- Mineral deposits especially in the south with great oil potential in the Niger delta
- Government policy- this aimed at resettling people in the west that was vegetated and the arid north sparsely occupied by the pastoral Fulani
- Industrialization- setting up of manufacturing industries in the south, east and north
- Urbanization- the increasing level of urban development in the south, west and along the Niger river valley
- Well laid transport and communication networks in the south delta area, west and central parts.

- Influence of ancient kingdoms especially in central and southern parts e.g. Hausa, Yoruba, etc
- Economic activities- the early practice of slave trade along the West African coast (Trans-Saharan and Triangular trade) greatly depopulated some coastal areas especially in the southwest and the collecting centres of slaves and trade items remained densely populated.
- Culture- the pastoral nature of the Fulani in the north makes the population projections unstable
- Religion- the dominance of Islam especially in the central and northern parts
- Natural occurrence- the southward movement of the Sahara and the consequent transhumance of livestock farming in the northern and southern parts

Effect or impact of the high population in Nigeria

- Consider advantages and disadvantages of high population

AGRICULTURE IN AFRICA

Agriculture is the growing of crops and rearing of animals on either a large or small piece of land for commercial or domestic purpose. It can also be categorized based on food crops for subsistence or cash crops for commercial use.

Agricultural systems in Africa can be subdivided into

- Subsistence /primitive farming- shifting cultivation, rotational bush fallowing, pastoralism.
- Modern/advanced farming- plantation farming, intensive scientific farming, ranching, etc.

(a) Subsistence farming

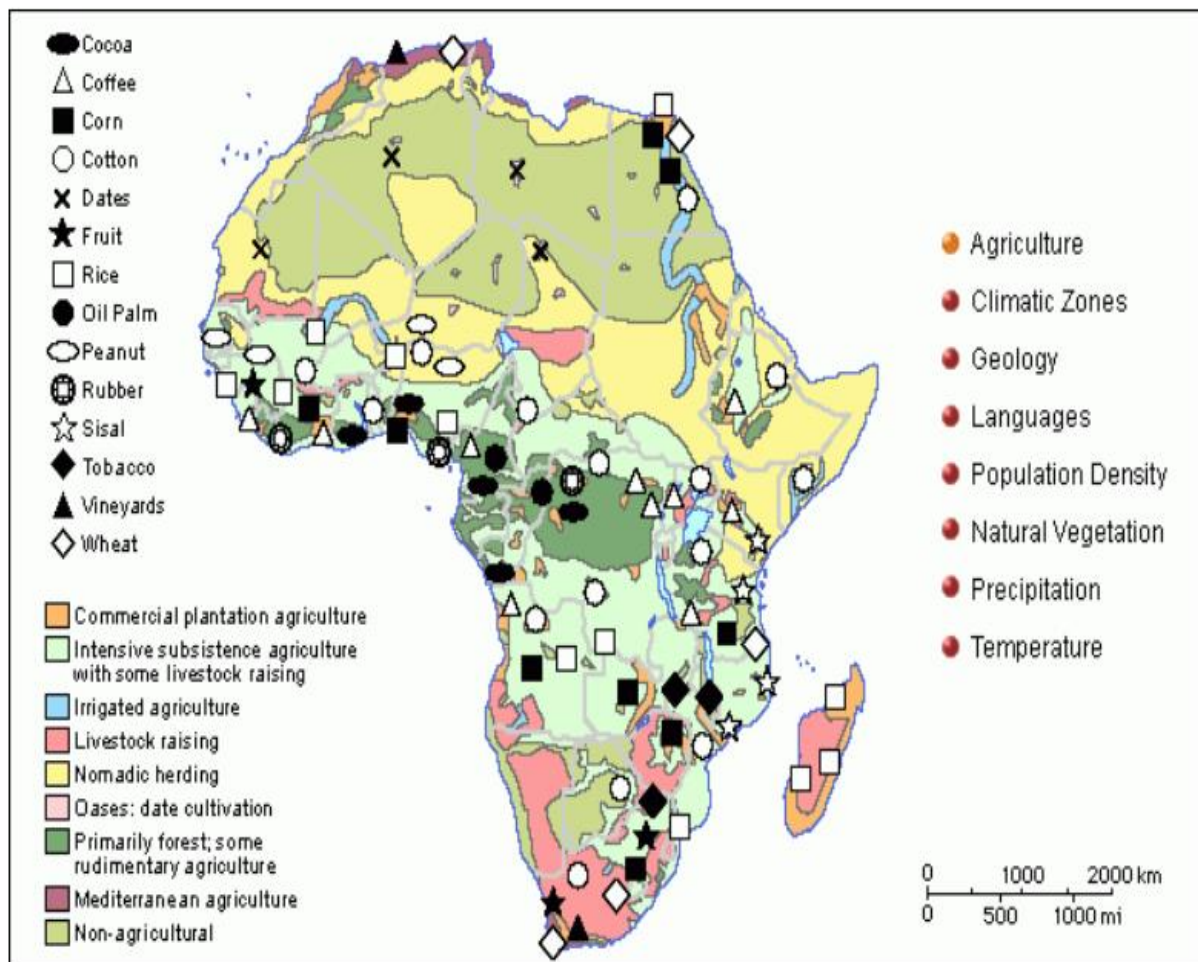
This is the practice where a farmer grows food and rears a few animals for home consumption mainly on a small piece of land.

Characteristics

- Use of family labor
- Use of elementary tools/rudimentary
- Food crops are grown
- Small piece of land is cultivated
- Plots are fragmented and scattered

- Basically meant for home consumption and no surplus for sell
- No use of scientific methods
- Supplemented by hunting, fishing, fruit/food gathering

Sketch map showing major crops and agricultural practices



Shifting cultivation

This involves the clearing away of natural vegetation so as to cultivate it; land is cultivated for 2 to 3 years after it is abandoned due to low crop yields thus moving to a virgin land. E.g. Azande of DRC, Bemba of Zambia, Benue of Nigeria and Chipinga district of Zimbabwe.

Characteristics

- Practiced on a small piece of land
- Family labor is used
- Plots are fragmented and scattered
- Clearing away of natural vegetation
- Use of elementary tools
- No care is given to the crops
- Mixed farming is practiced
- Involves shifting from the exhausted land to a virgin land.
- No use of scientific methods or inputs

Advantages

- High level of pest and disease control through weeding and bush burning
- Provides time for the practice of other activities like fishing, hunting, etc

- Very cheap due to use of family labor and elementary tools
- Less vulnerability to disease vectors and pests through mixed farming
- Soil gains fertility through burnt ash containing potassium, nitrate and sodium
- High chances of acquiring virgin fertile land

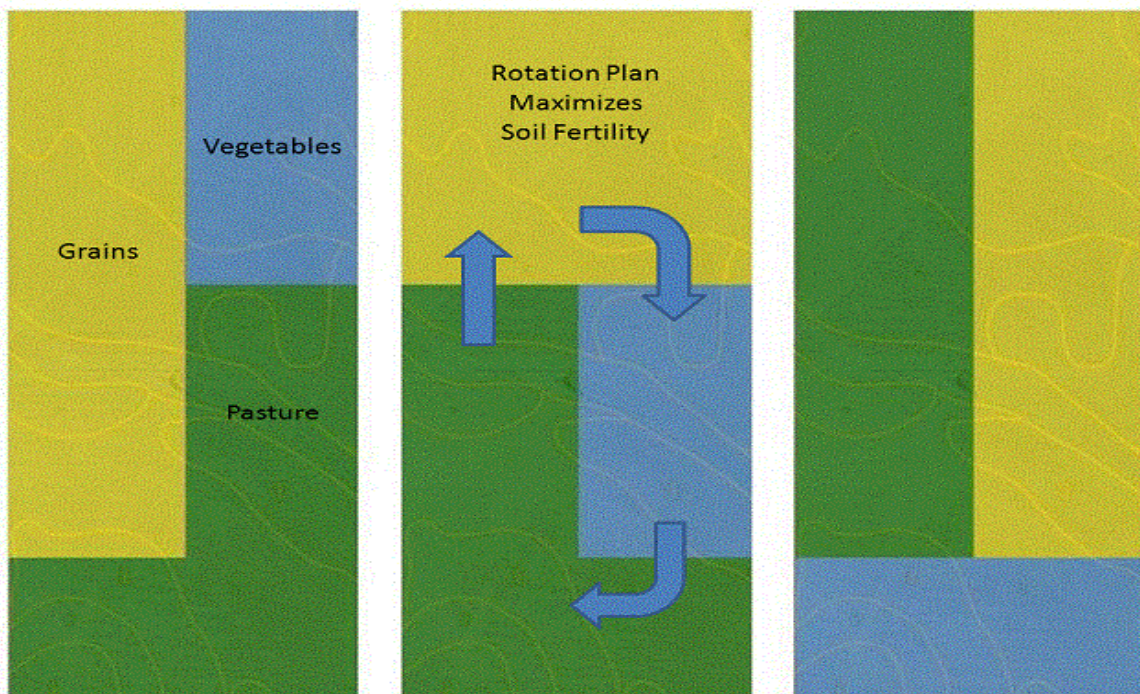
Disadvantages

- Bush burning exposes land to agents of soil erosion
- Limited food production
- Only practiced in areas with sparse population
- Its time wasting moving from one place to another
- Promotes environmental degradation
- Promoted land fragmentation by scattering cultivable land
- Limits possibilities of commercial farming due to being subsistence

Rotational Bush Fallowing

This involves the sub-dividing of land into manageable cultivable pieces or blocs which are farmed at intervals. One plot or bloc which has been intensively farmed is left to rest by fallowing while the adjacent one is cultivated as is the case in Ghana, Zambia and Nigeria.

Illustration



Characteristics

- Use of family labor
- Limited use of scientific methods
- Mixed farming is practiced
- Limited bush burning practices

- Use of elementary tools
- Involves movement of the farmer in the gazetted bloc
- Permanent settlement of the farmer
- Land is subdivided into manageable blocs
- Crops and animals are cared for
- Exhausted land is left to fallow (gain its fertility)
- Food crops are grown and the surplus is sold

Advantages of Rotational bush fallowing

- Encourages growth of food and cash crops
- Land is sustainably used since one block is cultivated at a time
- Helps maintain and increase on the soil fertility
- High yields are obtained due to cultivating sizeable blocs
- Provides room for modern farming through amalgamation of blocs
- Crops are cared for hence high productivity
- Relatively cheap due to use of family labor
- Limited vulnerability to disease vectors
- Limits environmental degradation since bush burning is limited

- Growth of cash crops improves standards of living

Disadvantages

- Absence of scientific methods affects crop yields
- Fallowing tends to house disease vectors and wild animals in the bloc
- Use of family labor limits greater output
- A few cash crops are grown which does not guarantee a better living standard
- Limits extensive commercial farming due to the small blocs cultivated
- Land fragmentation leads to time wastage and misuse of land

Pastoralism/ Normadic farming

This involves the rearing of livestock while moving from one place to another in search of water and pasture.

Normadic pastoralism is a cultural practice where rearing of animals is a dominant livelihood moving from one place to another searching for pasture and water.

Transhumance is the seasonal movement of pastoralists from one place (having unfavorable climatic conditions) to another (with better conditions).

In Africa, pastoralism is practiced by many communities like the Masaai of Kenya and Tanzania, Turkana and Pokot of Kenya, Karimojong of Uganda, Dinka and Fellahins in Sudan, Fulani of West Africa, etc.

Characteristics

- Large number of animals are reared with no respect for quality
- Local breeds are reared
- Land is communally owned
- Communal grazing is practiced
- Involves moving from one place to another in search for water and pasture.
- Animals are fed on natural pastures
- Family labor is used to graze animals
- Animals are kept for subsistence purpose
- Practiced in areas of aridity or areas with unreliable rainfall.

- Overstocking is practiced which brings about overgrazing.
- Bush burning especially at the end of the dry spell expecting fresh nutritious grass

Advantages

- Promotes unity and cooperation due to communal grazing and communal ownership of land.
- Helps preserve the nomadic culture since it's a cultural practice.
- Less prevalence of pests and disease vectors due to movement
- Less affected by natural calamities due to seasonal movement
- It's a basic form of employment to the natives where the herdsmen derive their livelihood.

Disadvantage

- Communal grazing leads to easy spread of diseases
- Prone to cattle raiding and rustling due to the culture
- Local breeds are reared leading to poor yields

- Long distances lead to tiredness of herdsmen and animals and death of animals

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- Bush burning destroys natural vegetation exposing the land to erosion agents like wind.
- It perpetuates primitive life styles in a modern civilized world

The practice of burning grass leads to environmental degradation which affects the natural vegetation and the soil texture.

Fulani community of West Africa

These are a typical nomadic community found in West Africa comprising of about 7 million people. They are traditionally referred to as the Fulah/ Foulah/ Fulbe or Peuls.

They are said to have originated from West Africa in Senegambia around the 4th and 5th century AD considered to be the largest nomadic group in the world characterized by lighter skin and straighter hair. They are subdivided into the nomadic pastoral Fulani and the settled Fulani (Fulbe wuro) speaking languages such as Pulaar or Fulfulde, Futa-toro, Futa-jallon and Masina.

Basically keep cattle, sheep and goats traversing the whole of West African territory from Mauritania, Senegal, Guinea, Gambia, Mali, Niger, Nigeria, Sierra Leone, Benin, Chad, Togo, Cameroon, Ghana, Liberia, Sudan and Central African Republic.

Sketch map showing the Fulani grazing land



Factors for the practice

- Pastoral culture as a livelihood
- Communal ownership of land

- Infertile sandy soils that can't sustain arable farming
- Limited open surface water
- Abundant pasture especially in the southern Savannah belt
- Sparse population in the region reserving large expanses of land
- Relatively flat land with few geographical barriers for easy movement
- Occurrence of natural calamities like drought, famine, etc
- Government negligence of not effectively caring for the nomads
- Aridity of the Sahel region with limited water and pasture
- Prevalence of pests and disease vectors that harm herdsman and livestock

Problems faced

- Occurrence of natural hazards like floods, famine and drought hence death of animals and herders.
- Presence of pests and diseases like ticks, tsetse flies and nagana, foot and mouth disease, etc

- Migratory nature makes the animals lose weight and some die
- Raiding and cattle rustling leading to loss of cattle and human lives.
- Limited pasture and water due to overgrazing and aridity
- Desert climate with high evaporation rates this makes open surface water very limited hence death of animals.
- Wild animals as they look for water and pasture
- Rearing of poor breeds that cause poor yields
- Limited grazing land for individual livestock
- Political instability caused by religious differences
- Absence of well defined territorial boundaries leading to clashes with hostile tribes
- Poor infrastructure especially roads to link the area to market centers
- Limited veterinary services and extension workers for the sick livestock
- Overstocking leading to over grazing
- Practice of bush burning leads to growth of coarse non-nutritious grass
- Limited labor for effectively rearing animals

- Loss and mistaken identity of the animals due to communal grazing
- Poor shelter and living conditions for the herdsmen

(b) Modern/Advanced farming

This is a more advanced farming practice involving the growing of crops and rearing of animals on a large scale using scientific means for commercial purpose.

Modern farming in Africa has greatly improved from subsistence farming to plantation farming, irrigation farming, ranching and market gardening/fruit growing/truck farming, etc.

Characteristics

- Practiced on a large piece of land
- Crops are grown and animals reared basically for commercial purpose
- Its labor intensive with paid labor
- Capital intensive
- Highly mechanized
- Use of scientific methods
- A lot of care is given to crops and animals

- Involves record keeping to ensure quality
- High quality seeds and exotic animals are kept
- Specialization with dominant crop or animals

Plantation farming

This involves the growing of one cash crop on a large piece of land for commercial purpose.

It is currently wide spread in Africa e.g. cocoa growing in Ghana, palm oil growing in Nigeria, rubber growing in Liberia, rice growing in Senegal, sugarcane growing in South Africa, etc

Characteristics

- Basically owned by foreigners or a joint venture with government
- Capital intensive
- Labor intensive
- Practiced on large piece of land
- Crops are perennial in nature like rubber, cocoa, etc
- Specialization
- Etc (as modern farming)

Advantages

- Effective utilization of land
- Very high productivity per unit area
- Source of employment opportunities
- Income earning by the farmers and plantation owners
- Government revenue through taxation and licensing
- Foreign exchange through export trade
- Promoted international trade and relations
- Infrastructure development for workers and communities around
- Provides market for industrial machinery
- Development of out-growers schemes and market for their produce
- Skill acquisition by the plantation workers
- Development of agricultural research and technology with better seeds

Disadvantages

- Promotes soil exhaustion due to monoculture
- Over utilization of fertilizers leads to acidity and distorting the texture
- Exploitation of labor with little pay

- Environmental degradation as natural vegetation is cleared for farming
- Distorts the climatic pattern of an area by replacing natural vegetation with crops that give little evapo-transpiration
- Great losses incurred in case of a calamity
- Price fluctuation due to high productivity and supply on the world market
- High competition from other producers and substitutes
- Profit repatriation by foreigners
- Displacement of people when more land is needed
- Crops have a long gestation of 3 to 6 years

Cocoa growing in Ghana

It is the second largest producer in the world after Ivory Coast with Kumasi as the main production area.

Cocoa tree is a native of the Amazon basin that was brought in Ghana in 1879 and export started between 1911 to 1976 with a gestation period of 3 years. Cocoa growing is dominant in the forested areas of Ashanti, Brong-Ahafo, central, western, eastern and

Volta regions where rainfall is between 1000mm to 1500mm per annum with temperature ranges of 21° to 23°C on plots of less than 3 hectares with the growing calendar starting in October.

Sketch map showing cocoa growing areas



DRAINAGE OF GHANA



Factors for growth of cocoa in Ghana

- Extensive land especially in the south that enables expansion of cocoa plantations.
- Well drained fertile soils that enables the production of good yields
- Abundant drainage in the south that provides water for irrigation e.g. river Tano and Pra
- Conducive climate having rainfall totals of 1000 mm to 2500 mm and temperature of 21° to 23°C.
- Low altitude towards the Atlantic favoring mechanization
- Abundant/cheap labor required for planting, harvesting, etc
- Adequate capital to buy farm inputs
- Positive government policy favoring plantation farming by giving out land and part of capital to investors.
- Efficient transport and communication networks e.g. railway network linking Axim, Takoradi, Accra, etc
- Agricultural research providing good quality seeds
- Political stability in the south favoring investment

- Internal and external market for seeds and products
- Natural equatorial vegetation shielding the cocoa trees from strong winds

Harvesting and processing

- Cocoa matures in 3 years producing pods that turn yellowish when ripe
- Harvesting is done with the help of a cutlass twice in a given calendar year i.e. September to January and April to July.
- Pods are heaped on the ground and later split open using a panga
- Seeds are extracted and laid on the ground for fermentation covered with leaves for 4 to 6 days
- The fermented seeds are then placed on a raised platform for sun drying
- The dry seeds are then packed and taken to the state cocoa marketing board for exportation through port Tema, Takoradi, etc

Uses

- Making chocolate
- Making cocoa butter and other cosmetics

- Making cocoa beverages
- Dry pods act as fire wood

Importance

- Employment opportunities to the farmers
- Skill acquisition in planting, harvesting and processing, etc
- Farmers earn income that improves on their standards of living.
- Government earns foreign exchange through export of cocoa and cocoa products.
- Revenue to the government by taxing and licensing cocoa processing industries.
- Promotion of international trade and relations with the importing countries like USA, United kingdom.
- Increased investment in the agricultural sector
- Favored out-growers schemes hence helping them earn a living.
- Agricultural research has been enhanced for quality seeds and pest control
- Avenues for academic research and study
- Promoted industrialization especially beverage industries

- Food from cocoa products like chocolate
- Infrastructure development especially railway linking Kumasi to exporting ports
- Urbanization in the cocoa growing areas like Kumasi and Accra

Problems faced

- Competition for market from other producers like Nigeria and Cameroon
- Competition from substitutes like cinnamon, tea, vanilla, etc
- Pests and diseases like swollen shoot and black pod disease
- Limited labor especially during the harvest period
- Land shortage arising from competition for settlement and industrial development
- Price fluctuation on the world market
- Railway transport is slow affecting delivery
- Unfavorable climatic conditions like heavy rains, floods in the low lands, prolonged dry spell, etc
- Limited farm inputs like fertilizers, insecticides, etc

- Congestion at the ports especially Accra, Tema and Takoradi
- Long gestation period

Palm oil growing in Nigeria

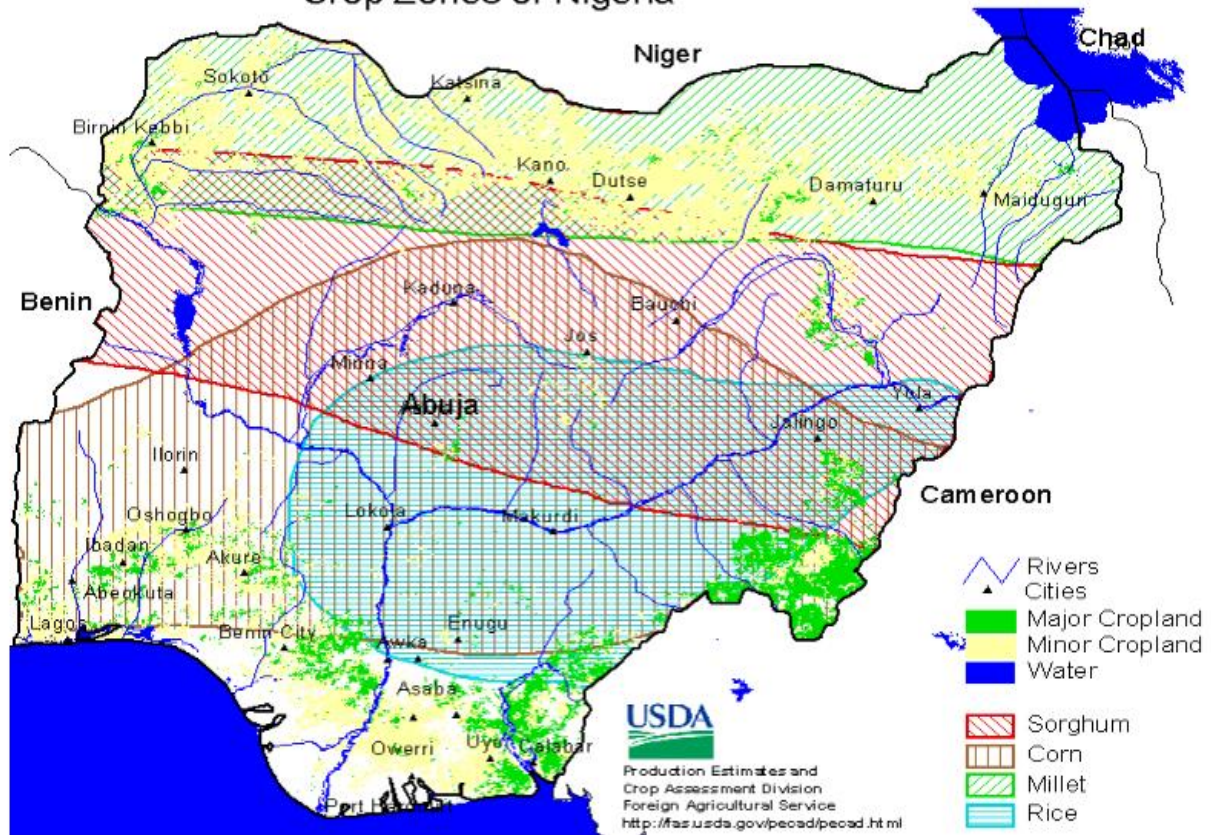
Oil palm is a native of West Africa referred to as ‘*elaeis guineensis*’ originating from Guinea. The oil palm can reach 60 to 80 feet in height in nature. It is grown mainly in southern Nigeria due to the natural vegetation and over 90% is from wild palms in groves around Warri, Onitsha and port Harcourt. It can also be propagated by seed using the F1 hybrid seed.

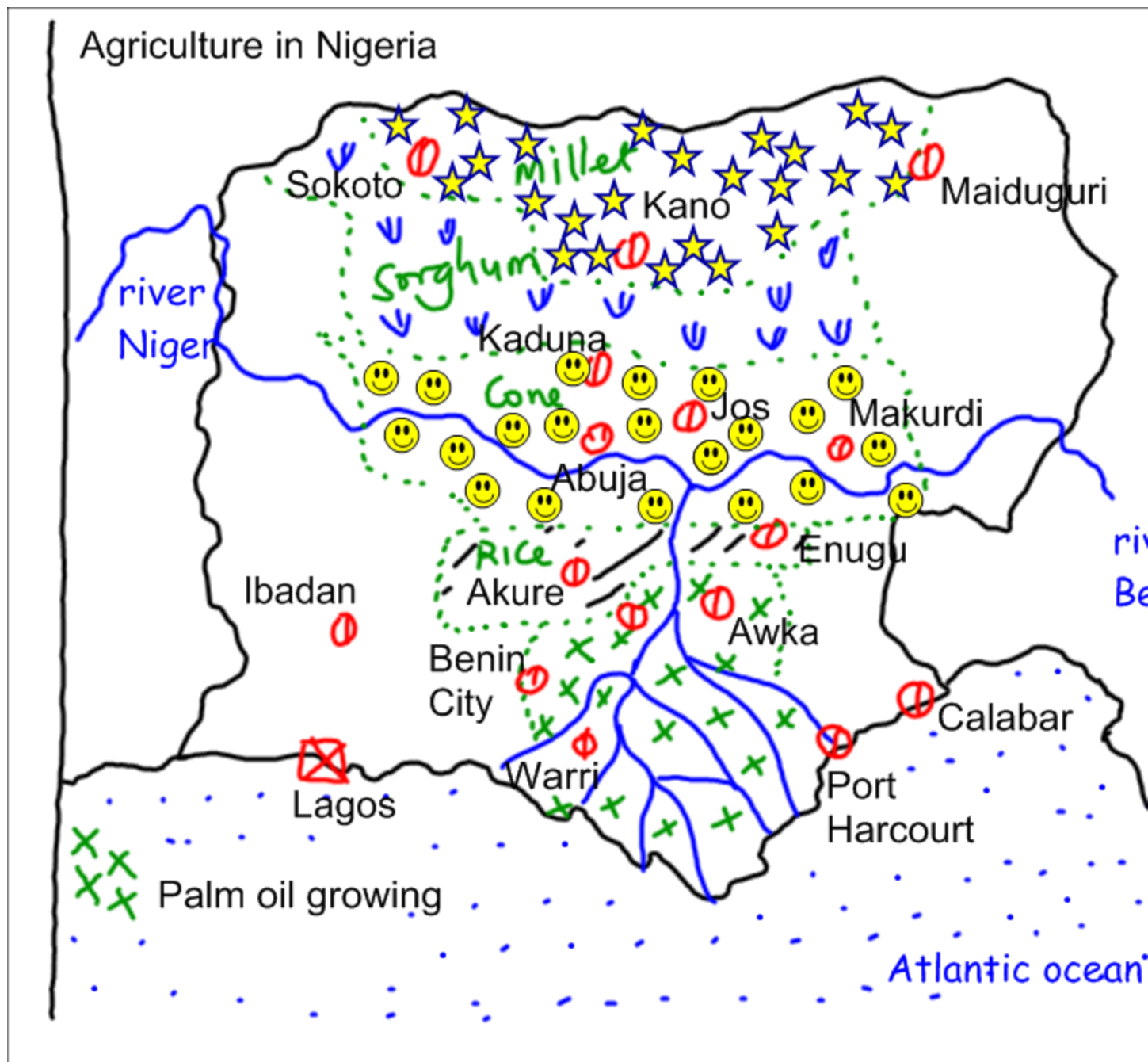
The mature trees grow up to 20 meters, palm fruit takes 5 to 6 months to mature from pollination to maturity. Nigeria grows other crops like cassava, yams, ground nuts, cotton, rubber, etc.

Other countries include Gabon, Benin, Ivory Coast, Togo, Sierra Leone, etc.

Sketch map showing crops grown

Crop Zones of Nigeria





Factors favoring

- Extensive land in the marshy delta region and the riverine area/shores i.e. Benue and Niger.
- Fertile alluvial soils of the delta region.
- Favorable climatic conditions i.e. 21°C and rainfall of 1500mm per annum
- Abundant labor for planting harvesting and processing
- Adequate capital to buy farm inputs
- Availability of ready market within and outside for palm oil and its products.
- Positive government policy favoring large scale farming
- Efficient transport and communication services like roads that transport palm oil and its products.
- Agricultural research by the Nigerian institute of palm oil research
- Requires simple technology in processing
- Relative peace and stability in the south unlike the north bothered by religious wars

Harvesting and processing

- Palm nuts mature in 3 years turning orange-red when ripe and each tree is visited 10 to 15 days as bunches ripen throughout the year
- Bunches are harvested with the help of a chisel or hooked knives attached to log poles for short trees and ropes for tall trees
- Palm nuts are detached from bunches by stripping and crushed/smashed by pounding in the mortar or hollowed out tree stump to weaken the veins
- The pounded fibres/pulps are then mixed with water for heating or boiling to remove excess water
- Oil melts out or is strained from the fibrous pulp and floats on the surface of the water
- Oil is then scooped off and put in vessels (traditional method) for use or by the hydraulic pressing
- Oil can be further purified at the oil mills giving a more refined product
- The nut shells are also crushed when dry extracting the white substance that is processed for consumable oil
- Palm oil is stored in large steel tanks at 88-105°F to keep it in liquid form during bulk

transportation and the tank headspace is flushed with carbon-dioxide to prevent oxidation

Uses

- Making cooking oil, cheese and margarine
- Making soap and other cosmetics
- Making paint
- Making palm wine
- Dry fibres and nut shells act as fuel
- Palm leaves are used in craft
- Ingredient for making bread mixed in the dough
- Salad dressing for a good color and aroma preserving it for 30 days
- Making peanut butter
- Used in coffee whiteners or coffee creamers
- Vegetable oil is used to replace milk fat in dairy products

Importance

- Employment opportunities e.g people who work in the plantation during the planting season,harvesting,marketeers,processors of palm oil etc.

- Income to the farmers improving their standards of living.
- Skill acquisition in processing oil by the workers who operate different machines to bring out the bi-product as oil.
- Government revenue through taxing and licensing of the different companies that deal in the planting and processing of palm oil.
- Foreign exchange through export of palm oil and other products like cheese, margarine.
- Reduces government expenditure on importing palm oil and the related items like edible oil, margarine, etc.
- Domestic food stuffs like cooking oil, palm wine are provided at relatively cheaper prices.
- Promotion of international trade and relations with countries that import Nigeria's palm oil and its products.
- Industrial development of beverage industries e.g. oil mills
- Development and improvement of infrastructure for purifying and marketing oil, transporting oil and other products etc.
- Agricultural research and modernization

- Ground for academic research and study

Problems faced

- Pests and diseases like anticrose and treekles
- Limited land for expansion due to competition from petroleum drilling, settlement, etc
- Limited labor especially during the harvesting season
- High cost of production and transportation
- Competition from other producers like Gabon, Ivory Coast that reduce the market potential.
- Competition from domestic substitutes like shear nuts, ground nuts, simsim that reduce projected profits and local market.
- Risks of death when climbing the trees
- Occasional flooding in the marshy areas affecting harvesting and transportation
- Price fluctuation in the world market
- Weeds that compete with the palm trees for nutrients in the marshy land
- Fire outbreak especially during the dry season through friction of leaves that claim acres of palm trees hence reducing quantity
- Pollution of land from the petroleum industries

- Civil unrest in the region of the Niger delta

Rubber growing in Liberia

This is called 'coatehouc' from latex a native of Brazil of the species of 'hevea-brasiliens' having a straight trunk and bark which is usually fairly smooth and grey in color growing to 40 m in the wild and 25 m when cultivated.

It is a perennial crop lasting for over 100 years but it is usually replanted after 25 to 35 years when the latex yields tend to reduce. It is grown in Nigeria, DRC, Cameroon, Liberia, etc

Rubber flourishes in the tropics with annual rainfall of 2000mm to 4000mm evenly distributed and temperatures of between 24°C to 28°C. It was started by Harvey S. Firestone in 1926 with Harbel plantation as the world's largest single estate covering 550 acres or 220 hectares with 10 million hectares underdeveloped. Currently rubber is grown in the southern part with plantations at Harbel and Carvalla managed by Harbel and Firestone companies respectively.

Sketch map showing rubber growing areas



Factors favoring Rubber growing in Liberia

- Conducive climate with temperatures ranging between 24°C to 27°C and rainfall of 2500 mm
- Extensive land in the south e.g. around Cavalla.
- Available cheap labor from former freed slaves

- Vast drainage with rivers like Fring and Cavalla, St. John that provide water for irrigation and to be used in industries.
- Adequate capital from government and Firestone company
- Positive government policy to provide meaningful employment to freed slaves
- Large/ready market for the rubber within and outside Liberia
- Efficient/improved transport and communication network for latex i.e. Railway, water transport
- Agricultural modernization like propagation or grafting where a bud from a mature tree is grafted onto a young rubber tree
- Presence of out-growers who sell latex to the bigger companies hence increasing production.
- Nearness to the Atlantic ocean causing humid conditions in the south that are vital in the growing and harvesting of rubber.
- Political stability though with civil unrest but, the south has been relatively peaceful.

Harvesting and processing

- Nursery stage for 9 months and propagation by grafting a bud from a mature tree taking 5 to 7 years for latex to be tapped.
- Latex is harvested very early in the morning by making a slanting cut on the bark of the tree at 35° done once every 2 days, in a small metallic bowl lasting for 10 to 20 years.
- Latex is then collected into bigger vessels and taken to processing factories
- At the factories, latex is diluted with water to avoid a sticky substance
- The solution is then mixed either with acetic or formic acid forming a spongy coagulated mass
- Coagulated mass is then rolled to drain out moisture/water and placed on rackets or platforms for sun drying to remove any moisture
- After removing the moisture a rubber sheet is formed from which materials for industrial and domestic use are got

Uses

- Making tyres and inflation tubes
- Making soles, gloves, condoms and safety boots
- Making insulators for electricity

- Making conveyor belts and winding engine belts
- Making stationery erasers

Importance

- Employment opportunities to the people e.g. rubber harvesters, managers of plantations, etc.
- Income to the harvesters hence raising their standards of living.
- Government revenue through taxation and licensing
- Foreign exchange through export of rubber and rubber products.
- Production of domestic and industrial items like tyres, insulators, safety boots that are sold at relatively cheaper prices to the home people.
- Growth of small scale out-grower schemes hence raising their standards of living.
- Skill acquisition by latex harvesters and processors
- Promotion of international trade and relations with Britain, USA, that import Liberia's rubber.
- Promotion of agricultural research through propagation or grafting.

- Development of other sectors from rubber profits e.g. health, education, etc
- Rubber trees help in climate modification through evapo-transpiration
- Plantations are used as demonstration farms for study and research

Problems faced

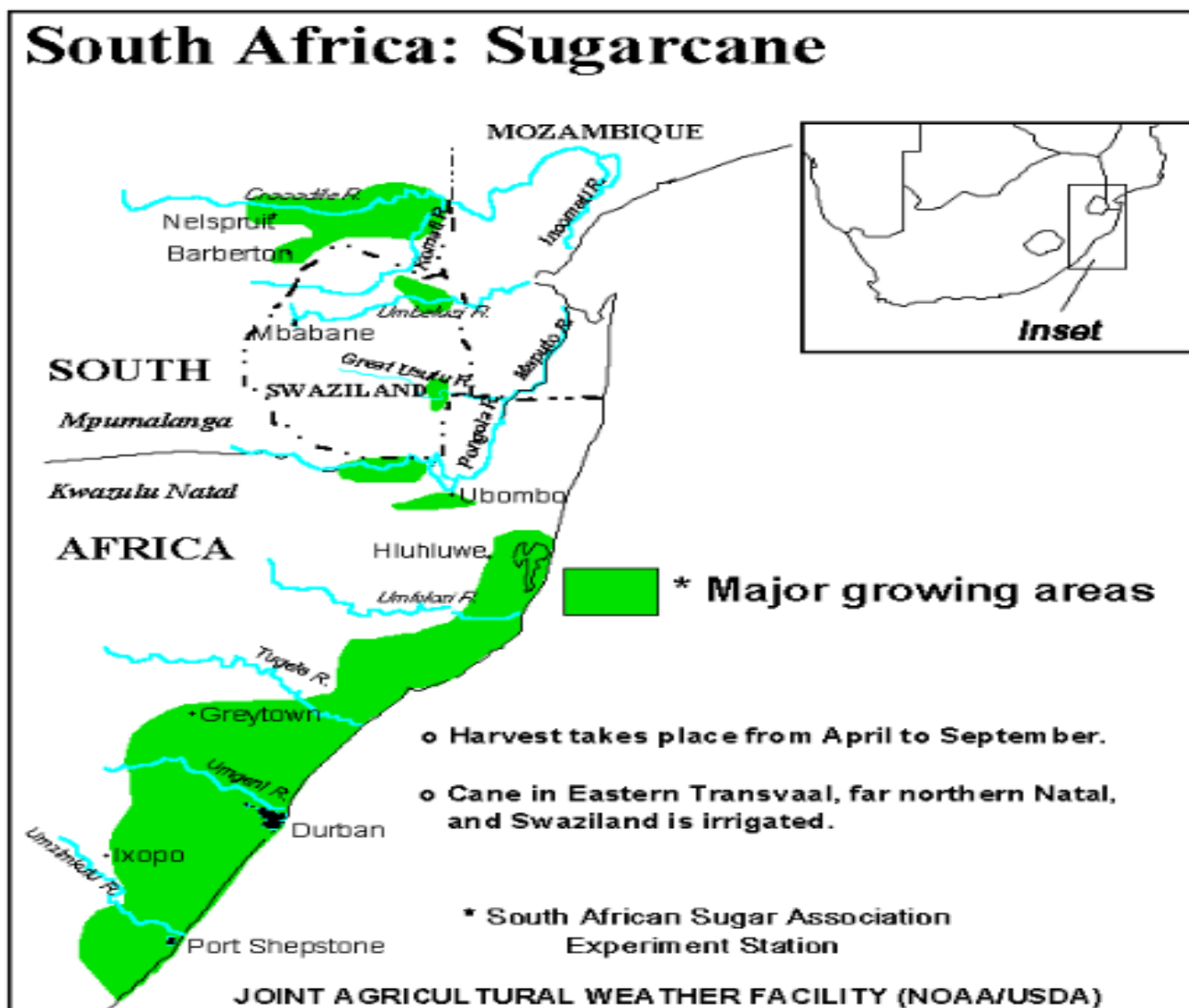
- Competition from other producers e.g. Nigeria and substitutes e.g. steel, plastics, synthetic fibres, etc
- Fire outbreak during prolonged dry seasons
- Limited skilled labor for harvesting and processing latex
- Wild animals that attack them when they are harvesting latex like snakes
- Long gestation period of 5 to 7 years affects projected profits
- Pests and diseases affecting the tree barks
- Rainy seasons waste time during the time of harvesting latex and the dry seasons make the latex sticky hence not dripping well .

- Changing government policies affecting the funding of rubber sector

Sugarcane growing in South Africa (Natal)

Sugarcane growing is dominant in Tongaat area in Kwa-Zulu Natal at the banks of Tongati river about 37 km north of Durban and 28 km south of Stanger. It is around 42,300 groves in Tongaat, Mpumalanga and eastern cape with 14 sugar mills e.g. at Maidstone, Darnall, Amatikulu and Felixton owned by 5 milling companies like Tongaat Hulett, Illovo and TSB sugar and a central refinery at Durban. Cane growing is restricted to the coastal areas stretching about 15 km inland covering 200,000 ha.

Sketch map showing sugarcane growing in Natal



Factors favoring

- Hot temperatures of 15°C to 27°C caused by the warm Mozambique current
- Heavy rainfall totals of over 1000mm per annum
- Generally flat landscape favoring mechanization

- Fertile well drained soils in the natal province
- Abundant water for irrigation from river Mkuse, Umfolozi, Umzimkulu, etc
- Adequate capital from South African sugar association
- Cheap labor by the south African people and immigrants from Angola and Mozambique
- Ready market within south Africa and outside
- Efficient transport and communication network especially railway and roads
- Positive government policy attracting investors
- Political stability also attracting investors

Planting and harvesting

The cane industry is owned by the South African sugar association which is one of the biggest co-operatives in the world. Some of it is grown by prosperous farmers.

- For large scale growing, land is ploughed and re-ploughed using machinery, manual labor and adding of fertilizers
- Canes are chopped with disinfected knives in length of 40 cm and then immersed in hot water of 50°C killing disease vectors for two hours

- The cane is then planted at staggered intervals so as to ensure all year production
- Fresh planted cane takes 18 to 20 months before harvesting
- Harvesting is done for around 9 months between May and December when sucrose is very high by chopping down the stem but leaving the roots to re-grow best done during the dry season for about 11 months
- After harvesting the cane leaves are removed and the cane tied in bundles to the processing factory
- Cut leaves are spread on the ground of the sugarcane plantation to avoid loss of moisture and land is left to fallow or regain its fertility

Processing of Cane

- Harvested cane is transported to the factory by road on trucks or railway
- Cane is weighed, chopped and crushed
- Crushing is done by giant pressure machines or large roller mills so as to extract the juice and the cane fibre is carried away for use in the boilers

- Juice is mixed with slaked lime to settle out the dirt to be sent back to the fields
- Juice is then thickened up into syrup by boiling off the water using steam in the process called evaporation in order to improve the energy efficiency of the factory
- Syrup is placed into very large pans for boiling, more water is boiled off until conditions are right for sugar crystals to grow with the help of sugar dust
- Resulting mixture of crystals and mother liquor is spun in centrifuges to separate the two.
- Crystals are then given a final dry with hot air before being stored ready for dispatch to domestic and foreign markets
- The by-product of molasses is used for making cattle food and alcohol

Importance

- A lot of foreign exchange is earned through export sugar products.
- Job opportunities to many people e.g sugarcane transporters, marketeers, factory managers etc.
- A lot of income is earned by the workers improving their standards of living.

- Development of towns like Durban, Shepstone.
- Development of infrastructure and social amenities e.g roads and railways, hospitals etc.
- Industrial development of sugar mills, beverage companies, etc
- A lot of revenue through taxation and licensing of sugar factories and plantations is earned.
- Advancement in agricultural research and better varieties
- Food stuffs for the people like sweets, sugar, molasses, etc
- Areas of academic research and study i.e. the sugarcane plantations.

Problems

- Competition from other producers like Sudan , Egypt
- Labor shortage during planting, weeding and harvesting
- Soil exhaustion due to monoculture
- Fire outbreaks that occur accidentally or intentionally
- Pests and disease vectors like leaf hopper and army worms, etc

Livestock Farming/ Ranching

Ranching is the modern way of keeping animals for commercial purpose in a well defined grazing land which is subdivided into paddocks rearing high or cross breeds.

In Africa ranching is practiced in areas of TransVaal and Natal in South Africa, Zambia, Botswana, Zimbabwe, Angola, etc.

Characteristics

- Animals are reared for commercial purpose
- Animals are kept in permanent farms
- Animals fed on natural pastures and supplemented by industrial animal feeds
- Farms are subdivided into paddocks which are fenced to avoid wandering
- Each paddock has a water trough for constant water supply
- The land or paddock that has been grazed is left to fallow as animals are taken to the next paddock for fresh grazing
- Quantity of animals in a given paddock is controlled to avoid overgrazing

- Pest and disease control is of great concern to ensure quality of livestock and products
- Selective breeding is carried out to ensure high quality livestock i.e. artificial insemination

Ranching in Botswana

Botswana is a landlocked country covering 581,730 km² with a population of about 2 million people and a population density of 2.9 persons/ km².

Batswana or Bechuana are a group of Bantu stock divided into eight principle tribes, the most important and most numerous being the Bamangwat speaking Tswana. They live primarily by subsistence farming and frequently tend herds of cattle.

Less than 1% of total land area is arable and raising livestock has been the most important agricultural activity in Botswana keeping goats, sheep that adapt to drought better than cattle do.

Livestock rearing is practiced in areas of Okavango swamp, Kanye, Makarikari due to the relatively undulating/flat land (most cattle is reared for beef than dairy products. Basic animal breeds are Aberdeen-angus, sanga/twana, taurine, zebus, tuli, barotse and American Brahman. Being largely a

desert country in the Kalahari with plain areas that receive between 200mm to 400 mm of rainfall with scattered vegetation, has greatly favored ranching in the area.

The people of Botswana are not truly pastoralists since they engage in subsistence farming growing crops like maize and sorghum. Hence cattle rearing is the dominant commercial activity practiced with the help of the government and the European Economic Community.

Sketch map showing ranching areas



Factors favoring

- Desire by the government to improve on animal husbandry and beef production
- Commitment by the farmers to adopt to new animal keeping methods like ranching
- Existence of large pieces of land relatively flat and easy for animal rearing
- Sparse population in Botswana provided large expanses of land for animal grazing

- Existence of poor local animal breeds that necessitated the introduction of cross breeding and high quality livestock
- Presence of ready market for livestock products within Botswana and the outside world
- Availability of large sums/adequate capital for setting up paddocks, acquiring high quality cattle, etc
- Presence of large demonstration farms in the Okavango area through which the farmers acquired new skills in animal husbandry
- Efficient/developed transport and communication networks like the railway line from Francistown to Lobatse
- Desert climate in Botswana with hot temperature, high evaporation rates and unreliable rainfall that did not favor arable farming.
- Relative peace and political stability which provided a good investment climate for domestic and foreign investors

Benefits of Ranching

- Many farmers have got employment which has helped them utilize inborn abilities

- A lot of foreign exchange is gained by the government through export of livestock products
- Learning of new animal husbandry techniques like paddocking, artificial insemination, etc
- Government earns a lot of revenue by taxing ranchers and imposing export duties
- Farmers have acquired a lot of income through the sale of livestock products improving their standards of living
- A variety of infrastructure has been set up like roads, slaughter houses, cattle dips, etc improving on the livestock industry
- Desert land has been put to proper economic use through ranching
- The practice has helped to diversify the economy from subsistence crop cultivation to commercial ranching
- Promotion of industrialization especially related to livestock products like beef, milk, skins and hides, cheese, etc
- It has enhanced the handcraft industry by putting to use the horns, skins and hides, hooves, bones for decoration

- Promotion of international trade and relations between Botswana and other countries
- Provision of food stuffs to the general public in terms of proteins, carbohydrates, fats, etc
- Animal waste is used for making fertilizers that are used to improve on soil fertility thus supporting agriculture in the long run
- It has enhanced urbanization in the ranching areas dealing in livestock products like Kanye, Francistown, etc

Problems faced

- Presence of pests and diseases like tsetse flies, ticks, rinderpest, nagana, foot and mouth disease, rift valley fever, etc. that affect very many animals and reduces the output or expected profits.
- Severe desert conditions like low unreliable rainfall and prolonged drought leading to shortage of open surface water and pasture
- Limited open surface water particularly in the South leading to over dependency on underground water that lowers the water table.
- Desert vegetation is not very nutritious hence poor and insufficient for the animals

- Some farmers have persisted in the traditional way of rearing animals which limits expansion of livestock ranching
- Limited land for animal grazing due to increasing competition for land in respect to settlement and other economic activities.
- Limited animal husbandry facilities to provide the necessary veterinary services and extension works
- The new breeds are not very adaptive to the desert environment causing health problems and poor quality livestock products.
- Limited market due to competition from other dairy farmers in Brazil, Texas, Arizona, Argentina, Norway and other sources of proteins like fish, beans, etc
- Perishability of the livestock products leading to wastage and loss
- Sparse vegetation cover bringing about soil erosion that washes away the top soil and brings about tough coarse non-nutritious grass
- Very expensive to manage the ranches because the animals require intensive care to harvest good quality products

Measures taken to improve Livestock farming

- Subdividing land into paddocks so as to regulate grazing
- Setting up demonstration farms to teach farmers new skills and principles of paddock farming
- Initiating quality breeds to check on the mixing of livestock and survival tactics
- Provision of water through boreholes, valley dams, water troughs, etc
- Provision of veterinary services through the mobile animal husbandry staff
- Establishment of animal facilities like cattle dips, slaughter houses, etc
- Establishment of Botswana Meat Commission that caters for the quality of livestock and marketing the products
- A system of disease control fences has been installed to prevent transmission of diseases from one herd to another.

Irrigation farming in Africa

This refers to the farming practice that deals with the artificial provision of water to support all year round production.

In Africa, irrigation farming is practiced in the semi-arid areas and those that receive unreliable rainfall yet with high evaporation rates e.g. the Gezira irrigation scheme in Sudan, Richardtoll irrigation scheme in Senegal and Awash irrigation scheme in Ethiopia.

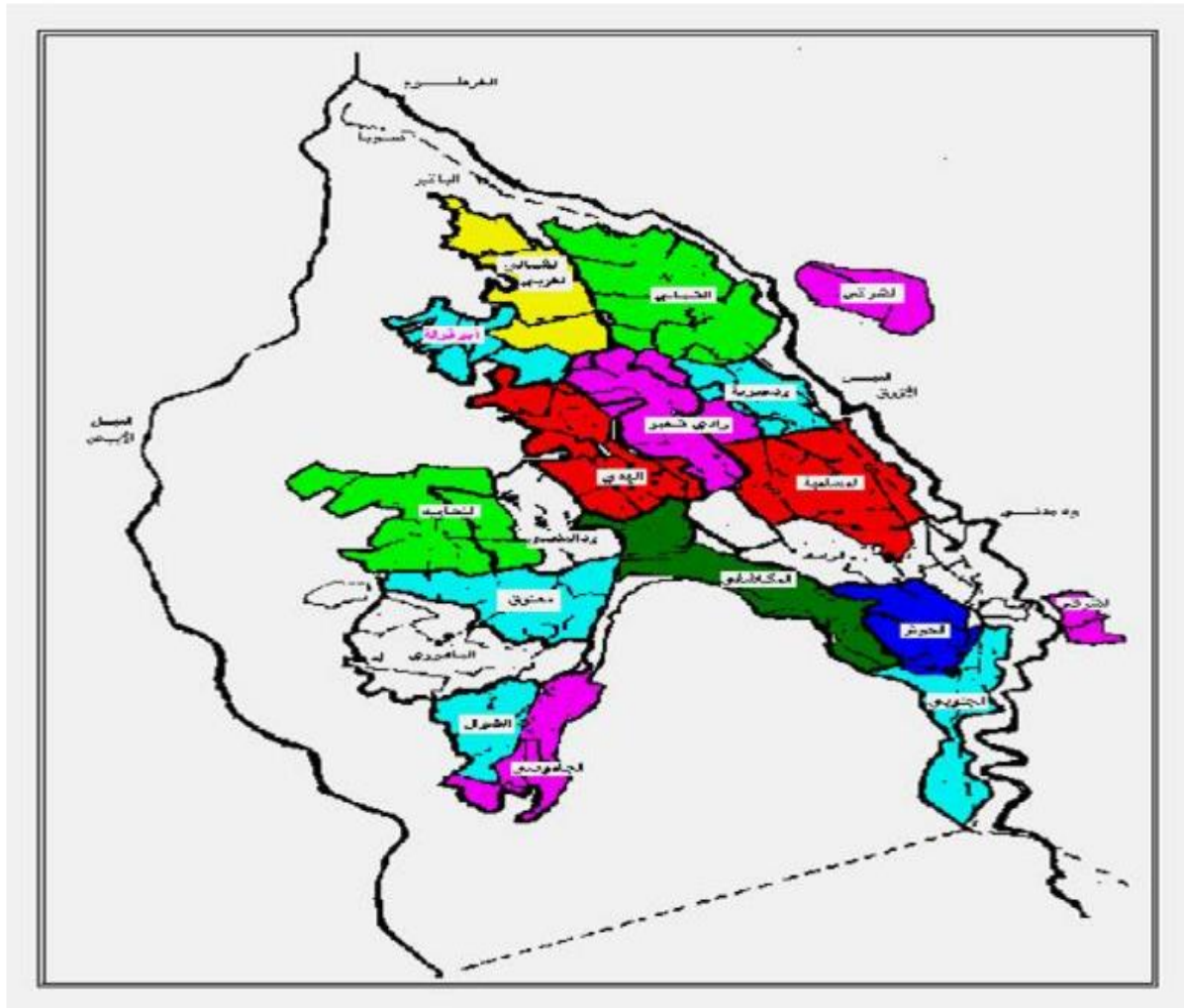
The Gezira Irrigation Scheme

It is found in Sudan along the great Nile river particularly between the White Nile streaming from Uganda and the Blue Nile streaming from Ethiopian highlands.

The scheme is situated in the state of Aljazera covering 250 feddans (each is 1039 hectares) which was the initial land cultivated in 1911 and by 1962 it had increased to 2.1 million feddans.

Currently the Gezira scheme covers 850,000 hectares with a network of canals and ditches which are 2700 miles long originating from an area of 880 km². Further developments led to the extension of the cotton area to Managil/ Manaquil following the completion of a new canal in 1950 and were finished in 1958.

A sketch map of the Gezira irrigation scheme



Cotton is the dominant crop grown with varieties such as;

- Very fine count cotton like margood, huda, shambat B

- Coarse count cotton like sudan acala, nuba-nebar, etc

There are other crops grown in the Gezira scheme like wheat, rice, millet, ground nuts, dura-sorghum, vegetables, fodder crops, etc

The scheme acquires its water from the Blue Nile with dams like Sennar, Washan Al-Qirbar, Arusayris, etc.

Organization of the scheme

It is managed at three basic levels i.e.

- Partnership level (government)
- Co-operation level (Gezira)
- Control level (Fellahin tenants)

(a) Sudanese government- provides the land for cotton cultivation together with irrigation of the land

(b) Gezira board- concerns with the managing of land, providing seeds, fertilizers, machinery, field advisers, inspectors coupled with infrastructure

(c) Fellahin tenants- these are the real owners of the cotton with each allocated 2 to 4 hectares of

cultivable land from which they harvest cotton and sell to the board.

After the sales, profits are partitioned as follows

- Government shares 36 %
- Gezira board shares 10%
- Community development initiative shares 4%
- Fellahin tenants share 50%

Currently the scheme management is subdivided into

- Engineering
- Investment
- Agriculture
- Finance
- Irrigation

The fields under agriculture administration are divided into 80 groups comprising 113 minor blocks.

The board of directors has 13 members representing different organizations chaired by the minister for agriculture and forests.

Objectives of the scheme

- To control flooding especially on the Blue Nile due to heavy rains in the Ethiopian highlands
- To expand cultivable land
- To ensure all year round crop production in desert land
- To diversify the agricultural sector from cotton to rice, millet, sorghum, wheat, ground nuts, etc
- To promote and provide employment to the nomadic Fellahins.
- To improve on the pastoral life of the Fellahins by practicing crop cultivation
- To invest the surplus capital from the oil exploitation thus engaging in plantation farming

Activities of the Scheme

- Between July and October- planting and weeding due to rainfall received in the region for cotton, dura sorghum, millet, rubia beans, vegetables, ground nuts, etc
- Between November and January- irrigating the land due to the dry season where water is extracted from the river and distributed in the cultivable land. However, sorghum is harvested together with canal dredging

- Between February and April- harvesting season for mainly cotton done by the Fellahins with some migrant labor. The cotton is then transported to ginneries at Barakat, Hasa-Heisa and Marangani for processing and export
- Between May and June- fallow period where land is given rest to regain its natural fertility and resume planting in July

Methods of Irrigation

- Perennial/Gravity- here the canals, ditches, channels are dug linking up the farm land to the water source flowing into the irrigation areas with a natural flow
- Archimedian screw- a water pipe is fastened on a motor like stand with a perforated coil on top. The spreading of water in the cultivable land is determined by the acceleration pressure of the water.
- Overhead lining- a perforated pipe is elevated higher than the basic crop height and well distributed in the irrigation land. When the water is released, it finds its way into the farmland through the outlets on the raised pipe.

Factors that favored the establishment of the Gezira Irrigation scheme.

- Extensive land in the Aljazera state where irrigation farming is done.
- Abundant water supply from the Blue and White Nile that is used in irrigation
- Fertile alluvial soils deposited by the Blue Nile in the Gezira valley that supports the growth of crops.
- Occasional flooding between the White and Blue Nile bringing not only silt but also excess water
- Arid climatic pattern with rainfall of between 200 to 300 mm that necessitated irrigation for proper plant growth
- Aridity that limits the survival of pests and disease vectors
- Desert like vegetation of basically grassland that was easy to clear
- Gently sloping and low altitude land which was conducive for natural water flow
- Land is basically above the water table which prevents water logging hence proper crop growth.

- Sparse population in the Aljazera state provided extensive land for cultivation
- Abundant labor by the Fellahins and migrant labor for planting and harvesting of crops.
- Adequate/large sums of capital from the government for buying machinery, farm inputs, etc
- Ready market potential within and outside Sudan
- Positive government policy that encouraged the utilizing of marginalized desert land so as to improve on the nomadic way of life of the Fellahins
- Improved transport and communication network especially the railway line linking the scheme to towns like Barakat, Sennar, Khartoum, Wadi-Hiafa, etc
- Rampant industrial growth and development where cotton was needed as a raw material e.g. textile industries at Marangani, Hasa-Heis and Barakat
- Advanced level of technology in irrigation science like overhead lining and Archimedean screw methods

- High demand for food by the people of Sudan which called for large scale food production through irrigation.

Importance of the scheme and Cotton growing

Many job opportunities to the Fellahins and immigrants e.g. in harvesting, planting, controlling the irrigation gadgets etc

- A lot of income has been earned by the people improving their standards of living
- Government earns a lot of revenue by taxing the Fellahins and its share of 36%
- A lot of foreign exchange is earned through the export of cotton to Britain and USA
- Infrastructure development like railways and roads that transport the cotton and other items from the gardens to market centres and refineries.
- Increase in cultivable land through irrigation hence increase in food production.
- Industrial development like ginneries and textile industries at Hasa-Heis etc
- Promotion of good international trade and relations between Sudan and other countries due to the agricultural exports.

- Reduction of destructive effects of flood water which is now reserved for irrigation
- Urbanization in the Aljazeera state like Khartoum, Sennar, Barakat, Marangani, Hasa-Heisa, etc
- Agricultural modernization through research via demonstration farms and research centres
- Provision of abundant hydro-electric power through dam construction at Sennar, Rahad, Jebel-Aulia, etc
- Enhanced economic diversification from agriculture to industry, transport, etc

Problems faced

- Competition from other cotton producers like Egypt that reduces their international market.
- Competition from cotton substitutes like silk, leather, rayon, greatly reduces the projected profits.
- Price fluctuation on the world market due to over supply of cotton hence reduction in the projected profits.
- Presence of pests and diseases like curl virus, rhizome pest, and black arm disease that reduces not only the quantity but also quality.

- Occasional flooding in the Gezira area due to heavy rains in the Ethiopian high lands
- Arid climatic conditions affecting proper crop/cotton growth and early ripening of cotton
- Siltation of the canals used for irrigation reducing volume of water
- Over production of cotton affecting projected profits
- Limited market for cotton as the latest technology does not require much cotton to produce consumer goods
- High expenses involved in irrigating land and dredging the canals
- Salination of the soil in the Gezira due to perennial irrigation making the soil salty and so not so fit for crop growth.
- Fluctuation in water levels especially during the prolonged drought season reducing the water table
- Presence of water weeds that congest irrigation canals and compete for soil nutrients
- Limited capital to fully invest in the agricultural mechanization and modernization which affects the quantity produced at the scheme.

- Changing government policies due to the rising administrative priorities
- Practice of monoculture leading to soil exhaustion
- Fellahins are often affected by the farm reptiles like snakes and scorpions that harm their health

AWASH

Irrigation Scheme

This is found in Ethiopia on River Awash stretching 120 km long from the mountain west of Addis Ababa to Lake Abe on the Djibouti border in Danakil desert.

River Awash is one of the 10 main river basins in Ethiopia with a total drainage area of 1010 sq.km originating from an elevation of 300m in the central highlands of Ethiopia flowing northeastwards along the rift valley into the Fare region pouring its water into lake Abe at 250 m

The scheme has about 180,000 hectares of irrigation land accounting for 67% of the total irrigation land. However approximately 69,000 hectares is under continuous cultivation.

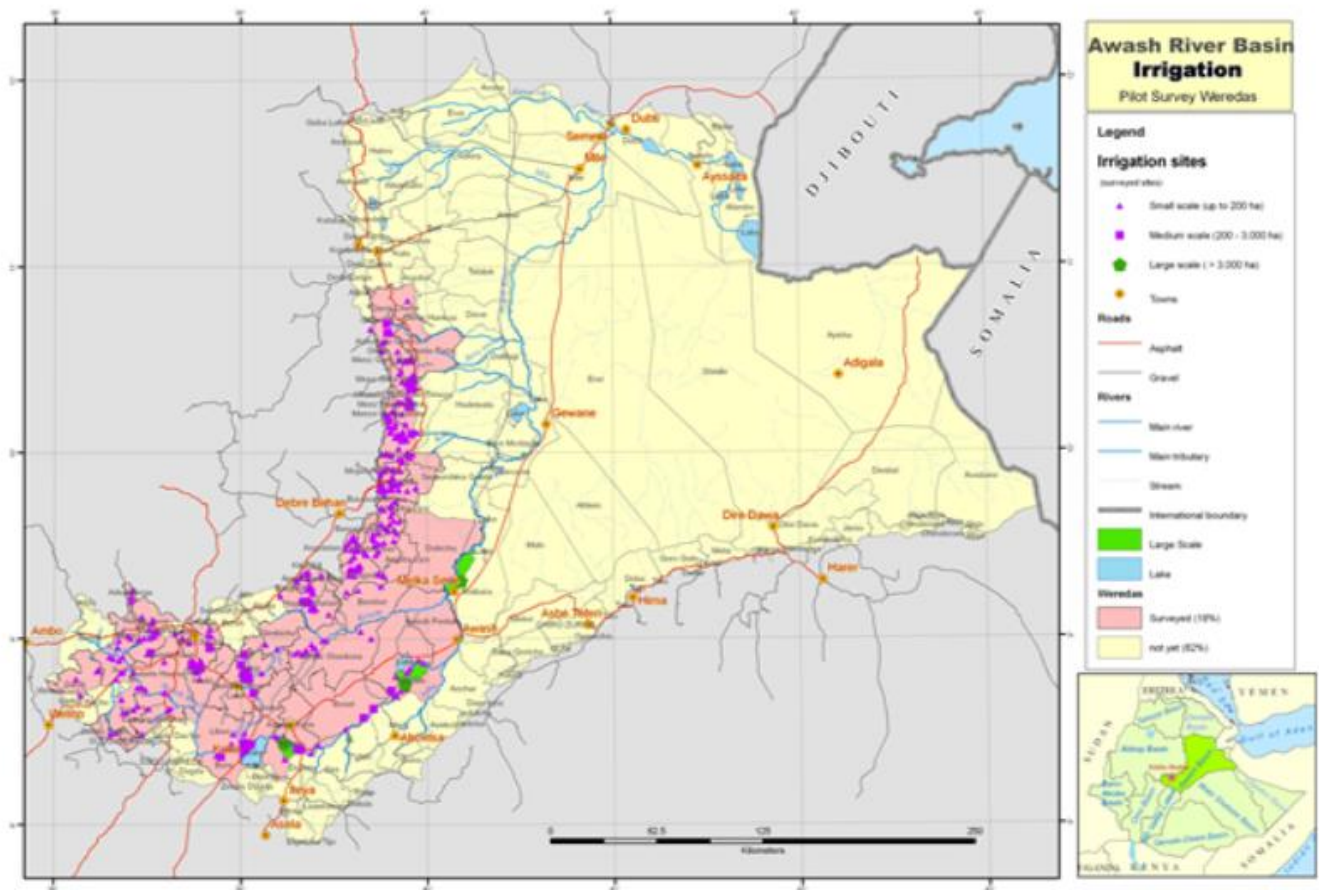
The scheme is subdivided into three .i.e.

- Wongi for sugar cane

- Malika-Amibara for cotton, tobacco and maize
- Tendaho for cotton

Awash has an irrigation potential of 2.7 million hectares earning Ethiopia the title of “water tower of Africa” with basins like Tekez-Atbara flowing to Sudan and Eritrea, Gibe-Omo flowing to Turkana in Kenya, Wabi-Shebelle and Genale-Dawa flowing to Somalia coupled with the Blue Nile and Baro-Akobo flowing to the Nile in Sudan.

Sketch map showing Awash Valley authority



Objectives of the Scheme

- To utilize the flood waters of river Awash that was being wasted in the Allideghi plains.
- To increase food production particularly maize in desert land
- To expand cultivable land in between the central plains and Ethiopian highlands which had fertile soils

- To ensure proper crop growth due to aridity where rainfall is of 250 to 750 mm on the leeward side of the Ethiopian highlands

Factors that favored the establishment of the Scheme.

- Unreliable rainfall that could not support natural growth of crops
- Fertile alluvial soils in the valley area suitable for maize, cotton, sugar cane, tobacco, etc
- Sunny arid climate with high evaporation rates leading to too much water loss
- Abundant water supply from the Awash river
- Sparse population on the lee ward side of the Ethiopian highlands
- Extensive land in the Awash valley area and central plains favoring plantation farming
- Nature of vegetation being grassland and low cost involved in clearing it
- Gently sloping land that favored gravitational flow of water from the river into the irrigation land
- Domestic and foreign market for the cotton and sugar cane

- Positive government policy of modernizing agriculture and transforming the marginalized desert land into the food basket of the region

Importance of the Scheme

- Nomads of the central and northern territory of Ethiopia now live a settled life as workers in the scheme
- Flooding has been greatly controlled and its destructive effects
- Food production has increased in the region like maize and sugar cane
- Industrial development at areas like Nazret and Kembolaha especially processing cotton, tobacco and sugar cane
- Job opportunities to many people e.g managers of the scheme, those who work at the water pumps.
- A lot of income to the farmers thus improving their standards of living
- A lot of foreign exchange through the export of cotton and sugar cane
- Infrastructure development of roads linking Addis Ababa to Nazret, Kembolaha, etc

- Dams have been constructed providing water for irrigation and power
- Urbanization in the region like Deso, Mojo, Nazret, etc
- Skill acquisition in the processing of cotton, tobacco and sugar cane
- Academic research and study in plantation agriculture

Richardtoll Irrigation Scheme

It is found in Senegal located within the Saloum and Casamance river areas extending from Ziguincoz to Kaolack.

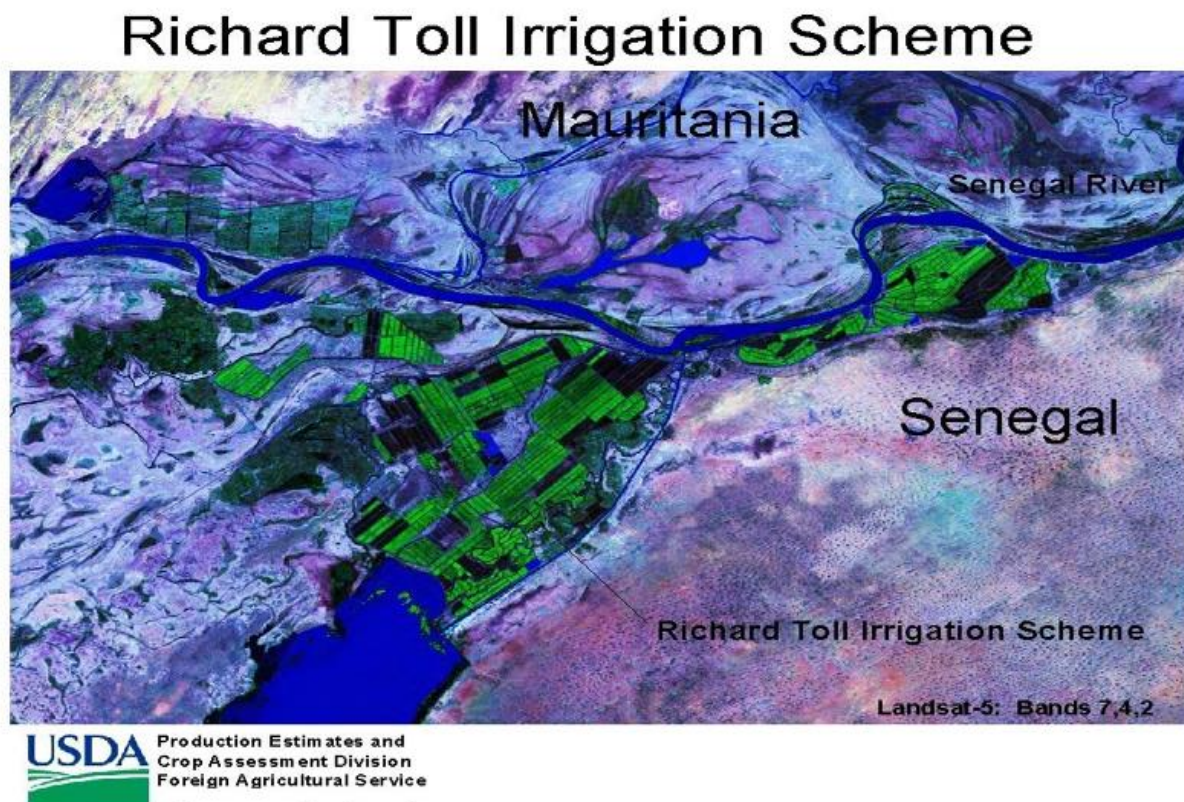
The scheme deals in ground nuts which is the major export crop of Senegal, however some peanuts are grown.

The Richardtoll headquarters are located on river Senegal over 60 miles from its mouth at St. Louis. Its development was due to the flat land and the dam which could facilitate mechanization and irrigation respectively.

Objectives of the Scheme

- To control flooding on river Senegal which was causing severe soil erosion
- To resettle farmers who were highly populated in the Kaolack area which was the potential cultivable land
- To diversify food production with respect to maize, millet and cassava
- To control monoculture in Senegal by introducing a favorable cash crop

Sketch map showing Richardtoll scheme



Organization of the Scheme

It is managed in three sectors i.e.

- The government which owns the land issues it to the scheme for crop cultivation
- The scheme board provides water for irrigation, seeds, machines and fertilizers through a co-operative society
- Tenants mainly grow the ground nuts mixed with peanuts, rice, maize and cotton
- However some migrant labor is used during the harvesting from Mali, Mauritania and Guinea

Senegal spends over 33% of its income on food importation particularly rice which is their staple food.

Factors that favored establishment of the scheme.

- Extensive land from river Senegal to river Casanance on which irrigation is carried out.
- Relatively flat land for mechanization extending about 2000 miles
- Positive government policy aimed at reducing on food importation and encouraged irrigation farming.

- Need to diversify the agricultural sector from subsistence to cash crop
- Availability of adequate/large sums capital to buy necessary farm inputs and the irrigation equipment.
- Abundant water from river Senegal, Casanance and Saloum and a water reservoir for irrigation during the dry season
- Fertile soils conducive for ground nut production
- Need to utilize the flood waters of the Senegal River to ensure all year round food production.
- Favorable modified desert climate by the cold canary current with relative rainfall and high temperatures
- Abundant/cheap labor within Senegal and from Mali, Guinea, etc
- Domestic and foreign market for ground nuts
- Strategic location of Senegal at the border with Atlantic ocean is close to market centres in Europe and USA

Importance of the Scheme

- A lot of land is under cultivation to a tune of 12,800 hectares
- Dam construction that helped control flooding
- Provision of irrigation water that supplements rainfall to ensure all-year crop production
- Many people have been resettled especially in the Kaolack area
- Reduction in dependence on rice importation which was increasing on government expenditure
- Economic crop diversification from ground nuts to maize, cassava, rice, etc
- Job opportunities to many Senegalese in planting, harvesting, marketeers.
- Income earning thus improving the standards of living
- A lot of government revenue through the taxation of tenants, transporters, etc
- A lot of foreign exchange is earned by exporting the ground nuts
- Urbanization of the areas like Thies, Kaolack, Touba, Ziguincoz where different crops are grown.

- Promoted good international trade and relations between Senegal and the countries that import her products
- Industrial development which is agro-based due to the provision of the agro raw materials.
- Enhanced agricultural research and study in plantation agriculture and irrigation farming.

Problems faced

- Salinity of the irrigation water due to high rates of evaporation.
- Harsh climatic conditions in the Sahel region i.e. too hot temperatures and low rainfall that calls for heavy expenditure on irrigation.
- High costs of maintaining the irrigation canals, dredging, etc
- Price fluctuation on the world market leading to losses.
- Pollution of the water by fertilizers and industrial wastes.
- Shortage of land due to increasing population and industrial growth hence low production.
- Presence of pests and diseases affecting the harvest

- Labor shortage during the harvesting of ground nuts leading to delays in production.
- Limited capital to fully invest in the agricultural sector

MULTI-PURPOSE RIVER PROJECTS

These are projects established on major rivers aimed at controlling and utilizing rivers to benefit man rather than destroying him.

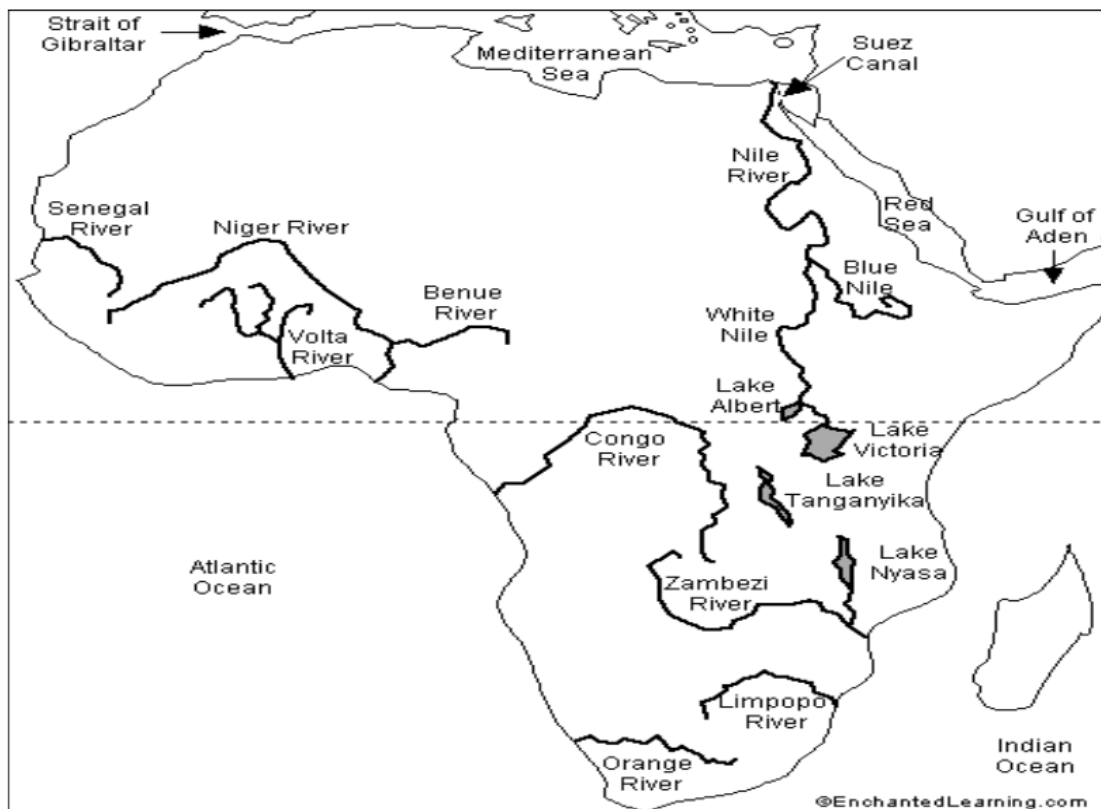
In Africa, these projects are mainly a joint venture between the government of a given country and a foreign body (either a country or institution).

Examples of river projects in Africa include;

- Aswan, Jebel-Aulia, Sennar, etc on river Nile
- Kainji, etc on river Niger
- Akasombo, Bui, Kpong, etc on river Volta
- Awash 1,2,3, Kaem, Koka, etc on river Awash
- Inga, etc on river Congo
- Gariep, Vaal, etc on river Orange

- Kariba, Kafue-George, Cabora-bossa, Victoria falls etc on river Zambezi

Sketch map showing major river/dam projects in Africa



Factors favoring the establishment of the projects.

- Presence of large sums of capital provided by the government and foreign bodies
- Various rivers having sites for H.E.P production like Niger, Nile, Zambezi, etc

- High volume of water in various streams with a steady flow annually
- Presence of falls and rapids providing good sites for dam construction
- Presence of narrow gorges in the youthful stages of a river course providing necessary space for dam construction
- Presence of strong basement rocks providing a strong foundation for dam construction
- Ice free conditions in Africa enabling easy flow of water annually
- Presence of advanced hydro technology especially in engineering where concrete and steel are established in rivers
- Cheap/abundant skilled labor within Africa and from abroad
- Increasing level of industrialization where electricity is essential
- Positive government policy aimed at realizing economic growth and development attracting foreign aid
- On-going drive of agricultural modernization in arid areas that require irrigation for crop growth

Aswan High Dam

It is found in Egypt situated on the great Nile and believed to have been constructed in 1902 with the first phase being completed in 1970 with the construction of canals from Asyut, Isma and Naghamadi. Due to increasing need to irrigate the desert land, an expansion phase was started in 1957 till 1970 when it was completed.

Aswan is said to be 2,600m long, 111m high and 40m wide producing power of about 2500mw.

Today, the dam has got a large water reservoir called Lake Nasser estimated to be 500km long.

Sketch map of Aswan High Dam



Objectives

- To control flooding on the Nile especially southern Egypt
- To generate power for domestic and industrial use
- To effectively put to use the deposited silt along the Nile banks
- To promote industrialization in the desert land of Nubia, Arabia, etc
- To improve on navigation in the south and central parts limited by meanders and rapids/falls

- To provide employment to the people especially the wandering nomads of the Nubian and Arabian deserts

Benefits

- Many job opportunities to the people were created e.g. Managers, engineers.
- Abundant power for domestic and industrial use hence development.
- A lot of revenue to the government by internally transmitting electricity and taxing electricity companies
- A lot of foreign exchange is earned by exporting power to northern Sudan
- It has become a tourist site earning foreign exchange from the foreign visitors.
- Improved international relations between Egypt and Sudan due to exporting of power.
- Agriculture has been improved through irrigation
- Lake Nasser acts as a fishing ground hence creating many jobs to the fishermen, mongers and boat manufacturers.

- Internal water transport has been improved on river Nile and lake Nasser
- Urbanization along the Nile like Aswan, Idfu, etc
- Skill acquisition in hydro-engineering, dam construction, etc
- It is a training ground for academic research i.e. in disciplines like hydrology.

Problems still being faced

- Many people were displaced to a tune of 2500 villages
- Vegetation along the river bank was destroyed
- Pollution arising from the industries constructed e.g. air and water pollution from fumes and wastes.
- Nile delta is nearly disappearing due to the limited deposition of silt towards the Mediterranean Sea
- Lake Nasser is now a breeding ground for disease vectors like snails and mosquitoes that affect the people.

- Dam traps a lot of silt from the upper Nile limiting agriculture on the lower areas of the Nile banks
- Rural-urban migration to the towns along the Nile and near the dam that comes with creation of slums and their related problems.
- Congestion in the towns due to high population
- Increasing levels of unemployment due to the dense population in the towns.
- Crime rate arising from unemployment
- Northern low lands are facing salination through underground seepage of sea water
- Increase in government expenditure within towns and project areas for setting up infrastructures
- Slum development near the dam and industrial towns with related problems like easy spread of disease.

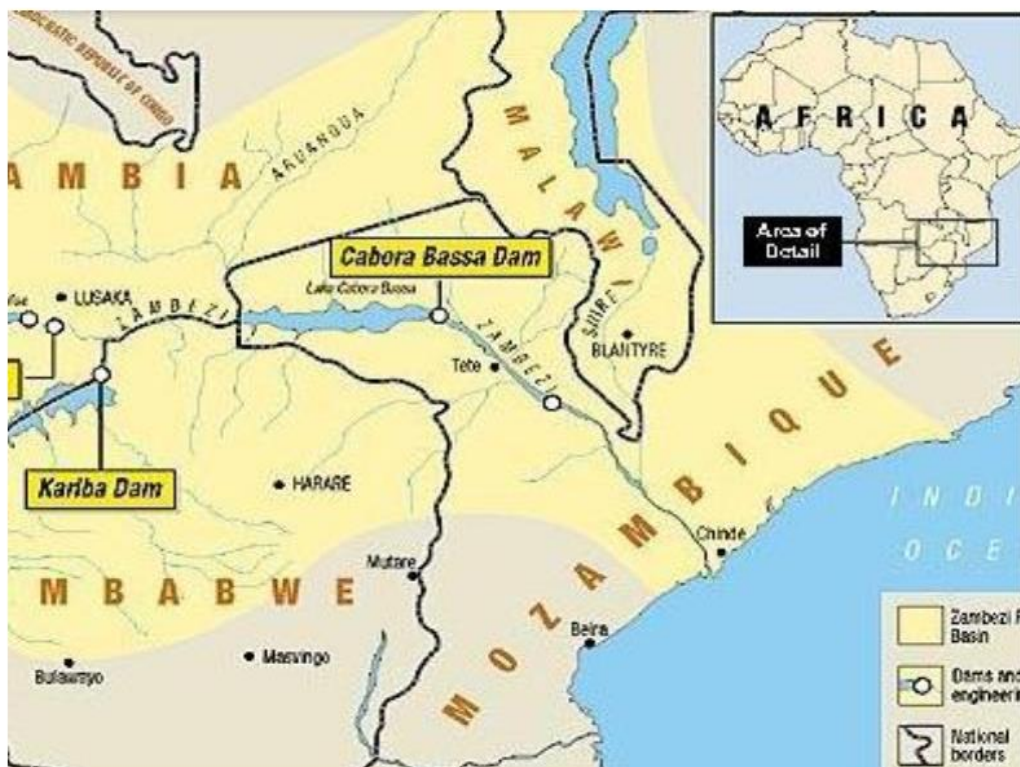
Cabora-Bossa Dam

It is found in Mozambique and situated on the Zambezi river at the end of the Quebra-bosa gorge.

River Zambezi has more dams like Victoria falls, Kariba and Kafue-gorge.

The dam was initiated in 1969 with the help of South Africa and Portugal and today comprises of a transmission line to Pretoria in South Africa.

Sketch map showing Cabora-bosa dam



Objectives

- To control flood water on the Zambezi river
- To produce power for domestic and industrial use

- To improve on agriculture especially in central Mozambique through irrigation
- Improve on navigation to open up the remote areas of northern Mozambique
- To promote economic development through industrialization

Benefits

- Power is now available with two transmission lines to Pretoria of 1900kw.
- Zambezi river is now navigable which has improved on internal navigation
- Agriculture has improved with respect to rice and cotton in the area
- Urbanization along the river like Tete and Sena urban centres/towns.
- Fishing is going on in lake Cabora-bosa
- A lot of foreign exchange is earned by exporting power to northern Zimbabwe, southern Mozambique and South Africa
- Infrastructure development especially roads along the Zambezi river.

- Many Jobs have been created to the people of Zambezi e.g. engineers, transporters, and managers.
- Promotion of industrialization especially textiles, iron and steel, etc.
- Floods have been controlled favoring settlement and agriculture along the river banks
- Lake Cabora-bosa acts as a water reservoir for domestic, industrial and agricultural use
- Improvement of international relations between Mozambique with Zimbabwe, Malawi and South Africa

Problems still being faced

- Section behind lake Cabora-bosa is un-navigable
- Occasional flooding due to heavy rains in southern Zambia and northern Zimbabwe
- Displacement of people in the central part of Mozambique and along the Zambezi river banks
- Destruction of the river banks near the dam, before and after due to settlement and industrialization.
- Pollution from industries around the dam i.e. air and water pollution.

- Rural-urban migration from northern and southern Mozambique that has led to creation of slums and the related problems like high crime rate and easy spread of diseases.
- Congestion in towns along the river like Tete and Sena due to dense population.
- Unemployment due to high population rates in towns.
- High crime rate due to the increasing level of unemployment

Akasombo Dam/Volta River project.

It is found in Ghana, situated on river Volta. The construction began in 1962 and was completed in 1966, a lake stretch of over 350 km with a surface area of over 8500sq.km was created behind the dam occupying about 30% of Ghana's land coverage and it is the third largest man made lake in the world.

Akasombo dam produces 350mw. It is complimented by Kpong dam after Sogakope Bridge south of the Akasombo dam.

Objectives

- To store water for irrigation during the dry season
- To control flooding on the Volta affecting the southern region
- To produce power for smelting of aluminum and bauxite
- To promote industrialization in the south and central regions
- To ease navigation towards the Atlantic ocean in the south.
- To promote irrigation farming especially in Nn Ghana which receives unreliable rainfall.

Sketch map showing Akasombo dam



Benefits

- Control of floods which encouraged permanent settlement
- Generation of abundant power for domestic and industrial use
- Development of industries in the region e.g. Volta aluminum company
- Improvement on navigation in the central region

- Many job opportunities were created i.e. engineers, dam controllers.
- Fishing is now taking place on the Volta lake
- Promotion of tourism leading to earning of a lot of foreign exchange
- Agricultural development in the south especially the Accra plains by irrigation like rice, ground nuts, tobacco, sugar cane, vegetables, etc
- A lot of foreign exchange to Ghana through the export of power to Togo and Ivory Coast
- A lot of income to the people(workers) improving on the standards of living
- Urbanization in the south like Akasombo, Krachi, Kpandu, Yeji, Yapei, etc

Problems

- Over 80 villages were displaced from their native land
- Rapid flow of water favoring breeding of simulum flies causing blindness and snails causing bilharzia
- Over population in the south especially near the dam

- Pollution of water by the industries in the region air and water pollution from the industrial wastes and aluminum refineries.
- Land fragmentation in the south near the river banks due to over population.
- Slum development in the towns near the dam and the associated effects like high crime rate, prostitution.
- Reservoir or Lake Volta occupies a lot of land in Ghana that would have been used for any other economic activity.
- Lake Volta has disrupted road construction like the north south road from Tamale to Kumasi
- Volta aluminum smelters consume a lot of power causing shortages

Kainji Dam

It is found in Nigeria situated on the Niger River in a remote and sparse populated area near the Jebba bridge. The dam was completed in 1967 with 12 generators producing over 960 mw.

The dam is 65m high and 4.5 km long.

Objectives

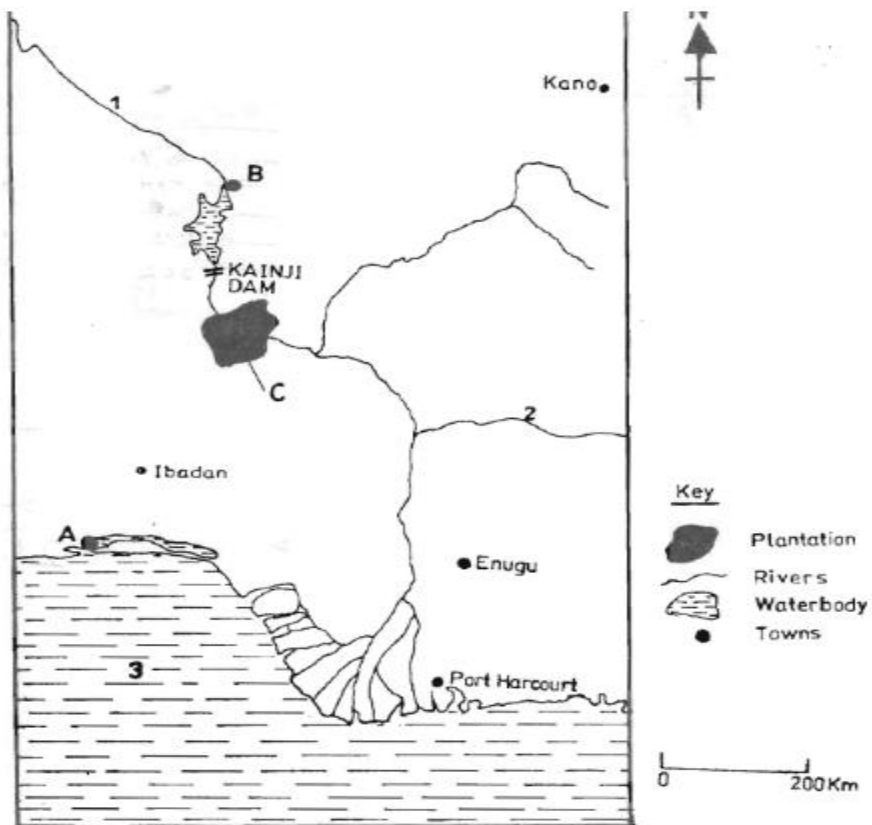
- To control flooding in the area of Lhorin, Ogbamosh, Ilesha and Kaduna
- To provide water for the dry north
- To improve on the nomadic life of the Fulani by providing them with water
- To promote industrialization in the central and north
- To provide more power for the south where there is oil drilling in the Delta region
- To improve on navigation in the north on the Niger tributary

Benefits

- Improvement in navigation all year round on the Niger river
- Floods were controlled reducing on its destructive effects
- Reservoir was created that provides water for irrigation especially for sugar cane growing.

- Increase in food production in the north and central region like rice and vegetables
- Fishing is carried out in the Kainji reserve
- Industrial development in the northern region e.g. textiles, foods and beverages.
- Urbanization in the region like Kontagoro, Ilesha, etc
- Power generation to the people of the north through transmission lines that have been supplying the south
- A lot of foreign exchange is earned by the government by selling power to Niger, Bukinafaso, etc

Sketch map showing Kainji Dam



Problems

- Displacement of people in the region about 4000 people though they were resettled at Bussa
- Slum development in the towns like Jebba
- Disease spread especially bilharzia, etc

MINERAL MINING IN AFRICA

Mining refers to the extraction of natural resources in their raw state from the environment.

Renewable natural resources refer to those that can be regenerated when exhausted while **Non-renewable resources** are those that when exhausted become extinct.(finished and never to regenerate)

In Africa, mining has greatly improved from its traditional or natural state sustaining a given society to a modern one sustaining a national economy i.e. becoming the backbone of many economies in the continent like Libya for oil, Zambia for copper, Sierra Leone for diamonds, Egypt for oil and phosphates, South Africa for gold, Liberia for iron ore, etc.

Mineral mining dates back to the early days of the Bantu who practiced iron smelting together with the British and the Boers who discovered gold at Witwatersrand and diamonds at Kimberly in South Africa.

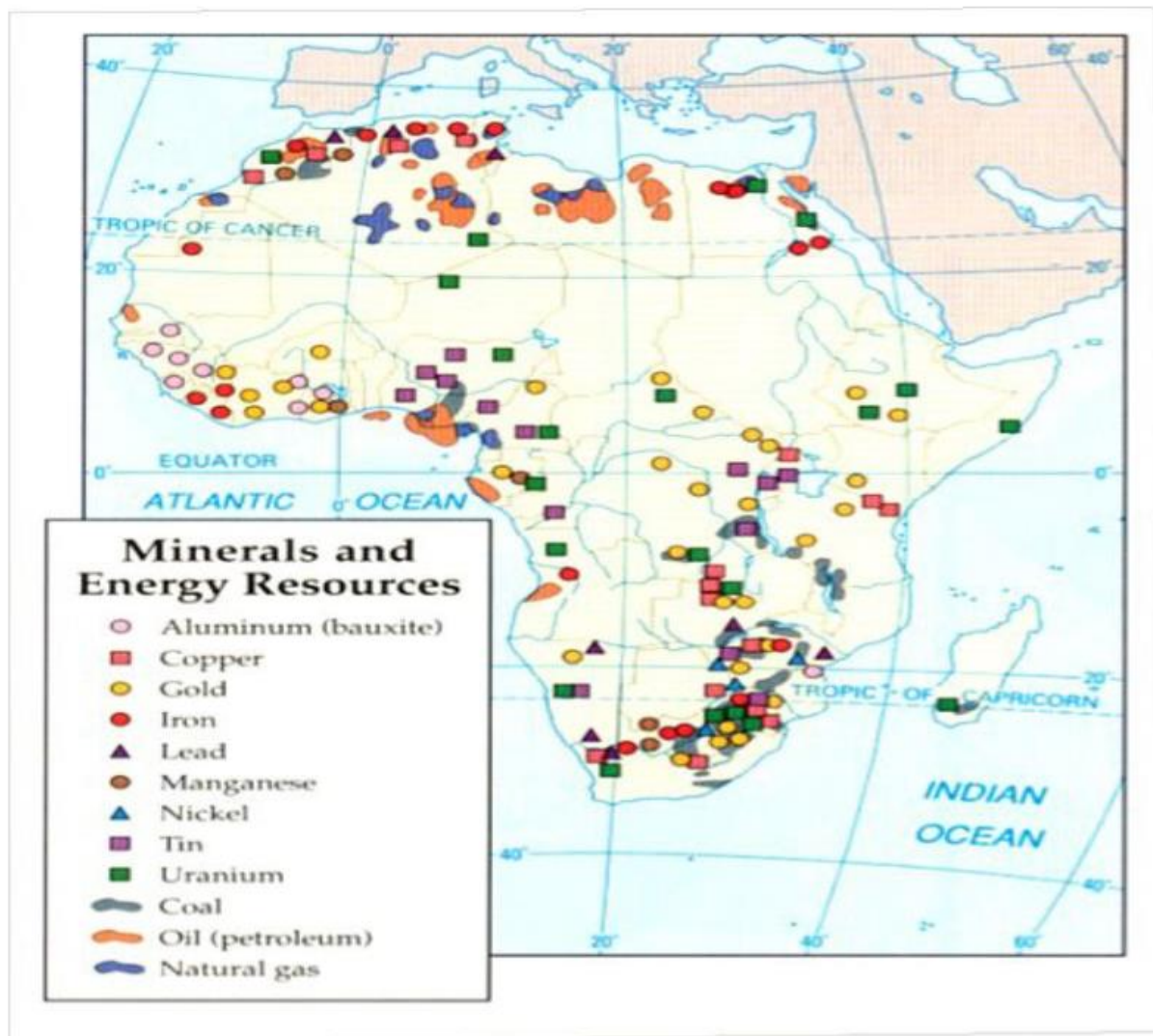
Some of the minerals mined in Africa include; gold, diamonds, coal, iron ore, bauxite, uranium, tin, limestone, copper, salt, oil, phosphates, etc in the different countries.

Factors that favored mineral mining

- Large mineral deposits of commercial value e.g. gold, diamonds, oil, iron ore etc.
- Extensive land for mineral exploration and exploitation
- Positive government policy of utilizing natural resources to meet the basic needs of the people i.e. tax holidays are given to investors.
- Availability of large sums of capital to organize or carry out exploration, excavation and processing of the minerals
- Ready and wide market potential for the minerals in Africa and the outside world

- Efficient/developed transport and communication networks especially railway to carry the bulky mineral ores
- Presence of cheap/abundant skilled labor like geologists, miners, engineers, chemists, etc for exploration, mining and processing minerals respectively
- Increasing level of industrialization where certain minerals are very essential for production like coal for energy, iron ore for metallic tools, copper for wires and bullets, etc
- Good quality and quantity of minerals in the crust with less impurities
- The nearness or depth of some minerals that determine the methods of excavation like shaft, open cast or adit
- Prevailing political stability that attracted investments in the mining sector
- Vocational training or technical education that provided hands-on skilled personnel that could excavate and refine the minerals

Sketch map showing major minerals



Copper Mining in Zambia

This is the major economic activity with the copper belt stretching from Luanshya and Ndola in the northeast to Bankroft in the northwest till Lubumbashi in DRC. Copper in Zambia accounts for 25% of the world's copper reserves and it's mined from folded sedimentary rocks.

Copper is found in the dominant structural feature of the Zambian copper belt called Kafue anticline, a northwest-southeast striking feature, the core of which is comprised of granite, schist and gneiss of the basement below the sedimentary rock formations.

The major mining areas Konkola copper mine together with Mopani, Lumwana, Kansanshi, Luanshya, etc and a refinery at Mufulira.

Sketch map of Zambia showing the copper belt



Methods of mining Copper

There are basically two methods used,

- Open cast- this applies when the mineral ore is near the surface of the earth requiring the excavation of the top layer of soil so as to reach

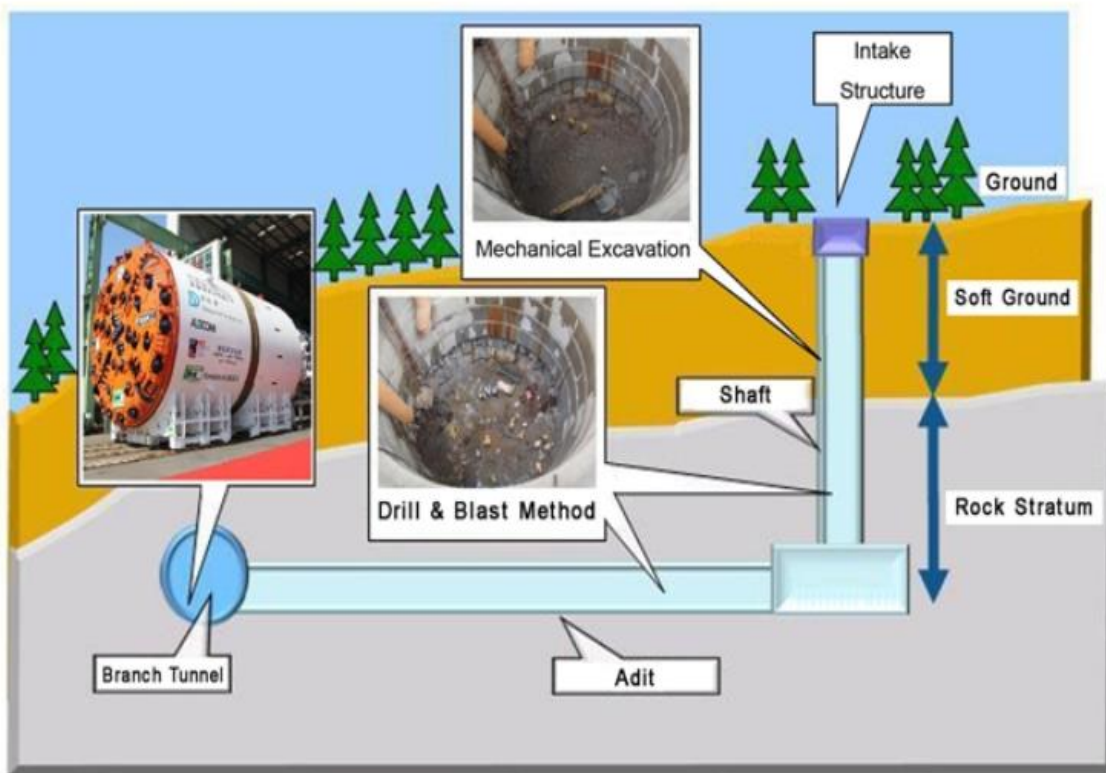
the ore body which is then extracted with the help of tractors and carrier truck. E.g. in Zimbabwe for gold, Karamoja-Uganda for gold, etc.

Illustration



- Shafting- this applies when the mineral ore is far deep in the earth's crust involving the construction of tunnels so as to reach the ore body. The length of tunnels or shafts is determined by the coverage of the mineral ore. E.g. in South Africa, Zambia, etc

Illustration



Processing of Copper ore

- After copper has been excavated from the crust, it is taken to refineries where it is pounded into powder forming copper oxide and copper sulphide.
- The powder is mixed with water to form a thin mud into which sodium salts are added to precipitate copper sulphide and sodium hydro-sulphide plus fuel oil to precipitate the oxide.

- Mineral processing is undertaken to liberate the copper mineral and remove waste constituents like aluminium, limestone, pyrite, silica, etc
- The new mixture is leached by adding sulphuric acid and milk lime to remove large properties of impurities like iron, sulfide ores, sulfur
- The leached mixture is taken for refining to remove the last tracts of impurities by electrolysis to extract the copper.(they use electricity to pass thru copper 2 sulphate and carbon, as electricity goes thru it the pure copper will be separated from the impure)

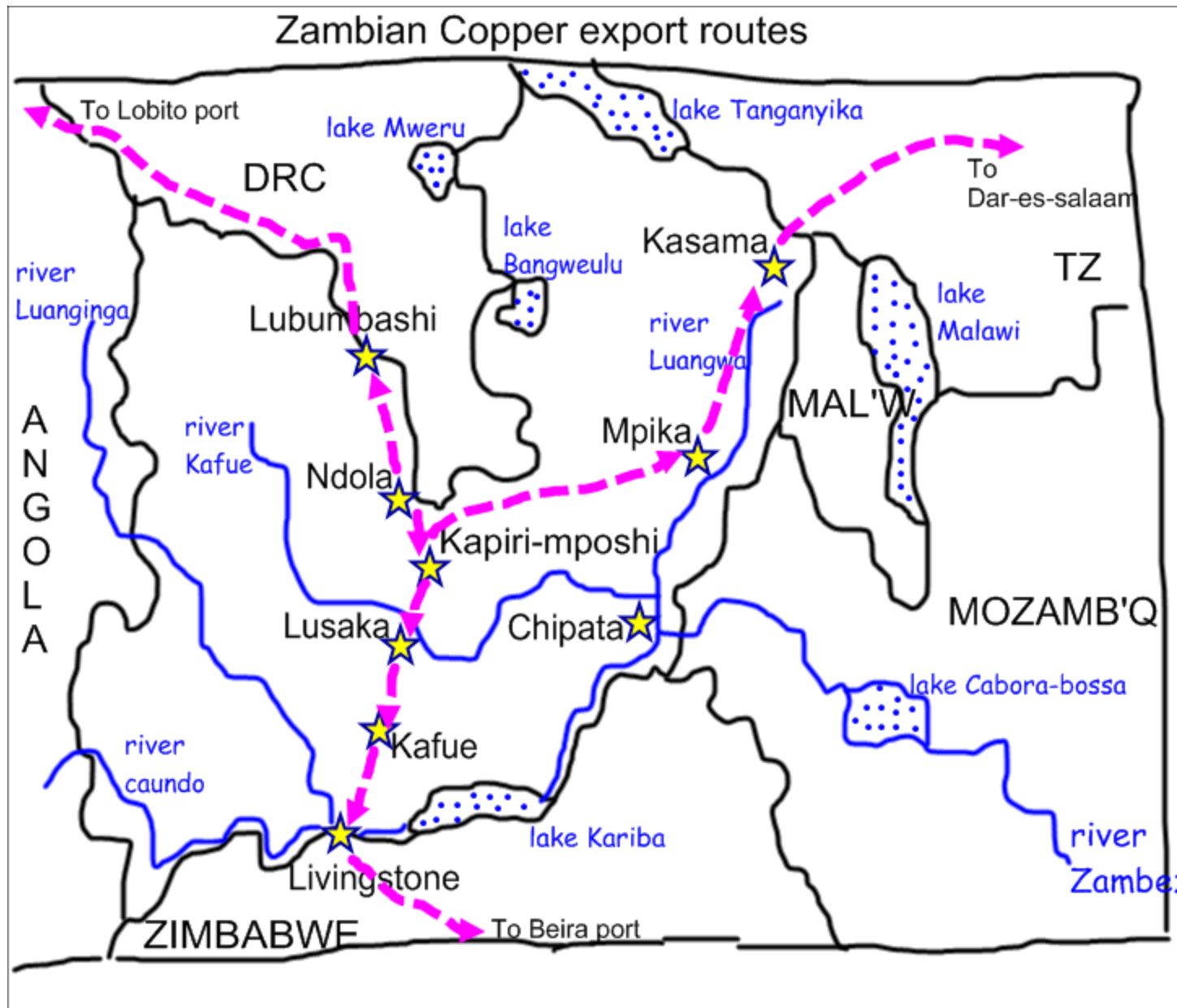
Export of Zambian copper

It is exported to countries like Germany, USA, Canada, Britain, Russia through major ports like

- Beira via Zimbabwe
- Nacala via Mozambique
- Lobito via Angola
- Dar-es-salaam via Tanzania
- Lubumbashi via DRC

Sketch map showing Copper export route





Factors that favored copper mining in Zambia.

- Abundant copper deposits in the Shaba province

- Good quality copper with less impurities that has competed favorably on the world market
- Abundant/cheap skilled labor provided initially by the British under British South African company which was staged in southern Rhodesia (Zimbabwe)
- Large sums/adequate capital provided by the British and Zambian governments used to run purchases and maintenance.
- Efficient and developed railway transport of the Tanzam railway/Tazara linking main mining towns to Dar-es-salaam, Lobito, Lubumbashi and Bulawayo.
- Prevailing political stability in the central region of Africa following the

colonization of south Africa, Botswana, Mozambique and Tanzania

- Wide and ready market for the copper in Europe and USA to make electricity and telephone wires, bullet shells, etc
- Use of advanced technology introduced by the British like open cast and shaft methods
- Sparse population in northern Zambia that favored mineral ore exploration and excavation of copper

Importance of Copper mining

- A lot of government revenue by taxing mining companies and workers.
- A lot of foreign exchange by exporting copper to USA, Germany.

- Job creation to many people of Zambia and immigrants from Zimbabwe, Mozambique, DRC and Tanzania
- Income earning by the miners leading to improved standards of living
- Infrastructure development especially the Zambian railway linking Ndola to Dar-se-salaam, Maputo, Lobito, etc
- Urbanization in the mining regions like Kitwe, Ndola, Nkana, Kafu, Bwana-mkubwa, etc
- Promotion of industrialization in the region like copper refineries and smelting factories.
- Provided ground for academic research and study relating to mining

- Promotion of international trade and relations with other countries that import Zambia's copper e.g. USA.

Problems facing the Copper sector

- Existence of industrial substitutes like aluminium, iron ore, silicon, bronze performing a better job than copper that limits its market.
- Competition from other copper producers like DRC, Egypt, South Africa, USA that reduces the projected profits.
- Exhaustion of copper especially in the northern territory
- The Tazara railway is very slow yet it is the basic means of transport
- High taxation by the government affecting the projected profits

- Mining machinery have depreciated or are outdated and often break down affecting quantity projected.
- Limited skilled labor required for exploration,excavation and processing the copper ore leading to delay.
- Limited electricity that is much needed to light up the tunnels/ shafts, to power drilling machines and process the copper ore
- High cost involved in mining, transporting and processing the ore
- Zambia is a landlocked country experiencing high transport costs due to limited access to the ocean and potential markets
- Fluctuation in copper prices on the world market

- Copper ore is now too deep in the crust requiring advanced machinery which are expensive
- Presence of some impurities in the copper which affects the quality to be obtained and sold
- Collapse of tunnels killing skilled miners and destroying machinery

Oil mining/drilling in Nigeria

Oil mining is dominant in the north of Africa like Egypt, Libya, Algeria, Nigeria, and also south of the Sahara in Gabon, Ivory Coast, Ghana, Angola, Equatorial Guinea, etc.

Nigeria is the largest producer south of the Sahara and drilling started in 1937 though the fields were not economically viable. However in 1956, new discoveries were made in the Niger delta

region of the south which today is the main oil mining region of Nigeria.

Sketch map showing Oil fields



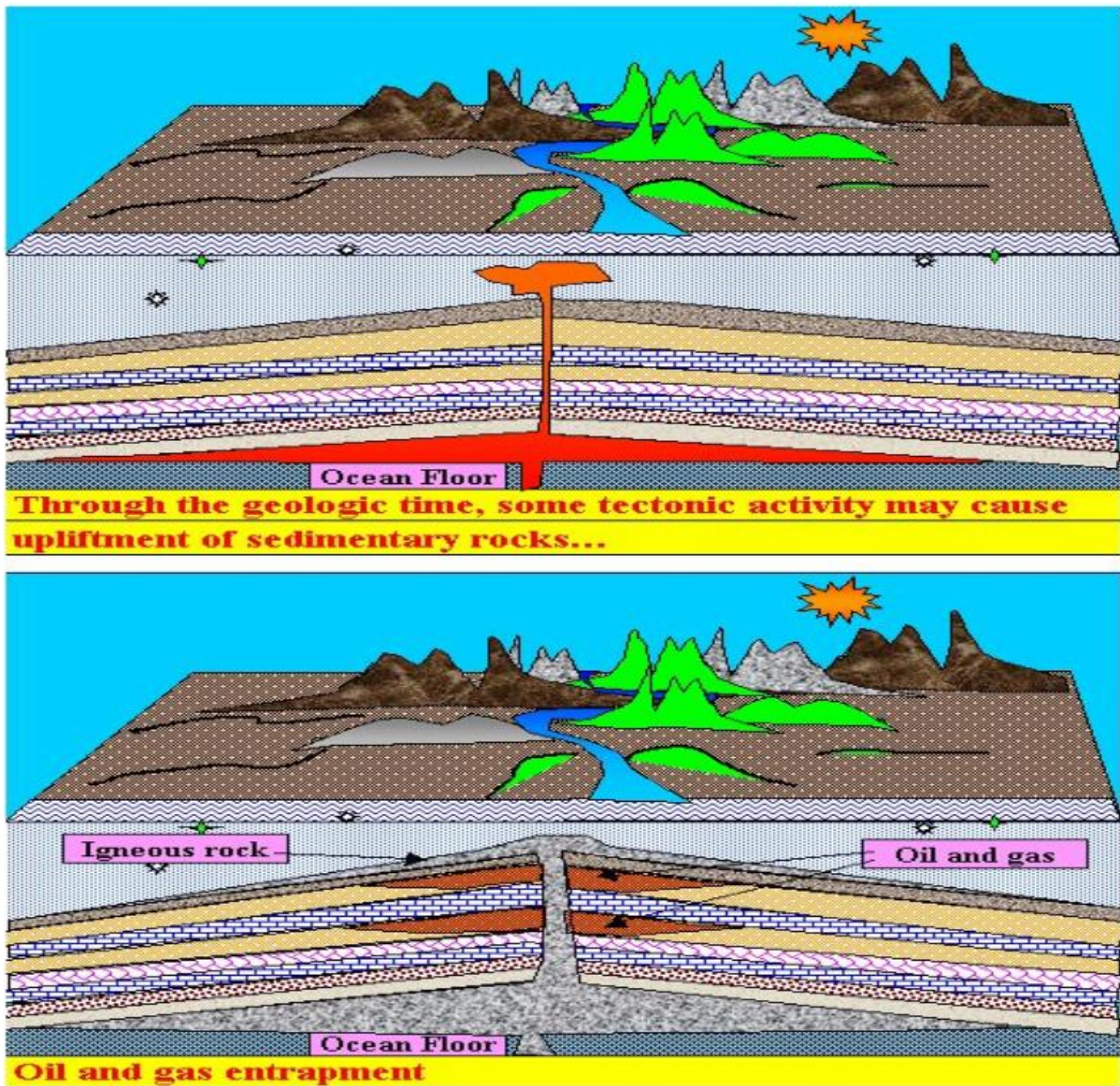
Formation of Crude oil

- Crude oil is a natural state of consumable oil and a compound of carbon and hydrogen.

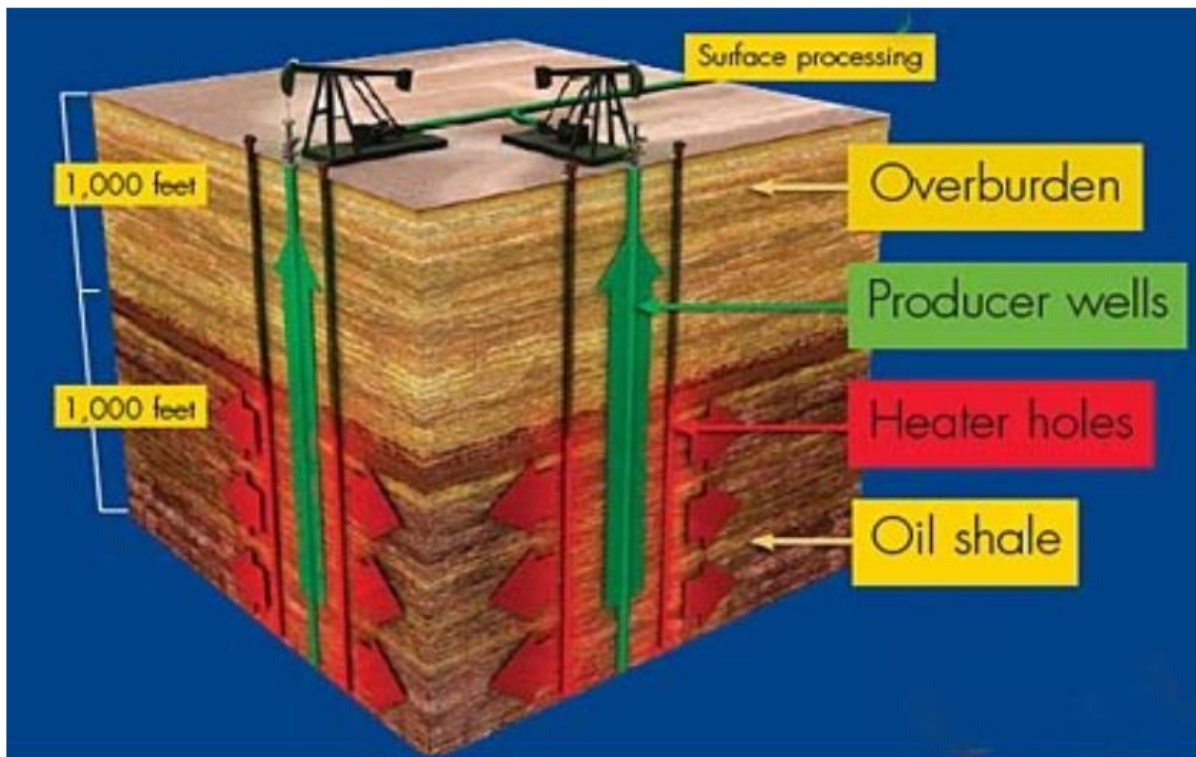
- It comes about due to decomposition of fatty parts of organisms such as man, fish, plant, etc that formerly occupied rivers, lakes, seas, oceans and land.
- After thousands of years, the large amount of organic matter was collected and buried in sand and mud layers which later underwent high pressure changed into oil and natural gas through fossilization
- Crude oil then got trapped in the folded rock layers and bound sedimentary rocks which are impermeable or impervious in nature. It's from these rocks that oil is explored and drilled out for use

Illustration

(a) Rocks containing oil



(b) Exploring of Oil



Oil drilling

- When oil has been detected, it is either drilled out or pumped out of the well
- This is done with the help of a metal instrument called a Derrick which has a fitted steel pipe whose end has a drilling bit/ sharp end.

- The drilling bit is forced into the crust through various layers of sedimentary rocks until the crude oil is reached
- Mud and water are then pushed down the pipe to lubricate the drilling bit as it penetrates through the rock layers and to flush out the broken rock particles
- When the well is reached, crude oil gushes out due to air pressure or it is pumped onto the surface and taken to the refineries by pipe

N.B: Most times oil is exported in its crude form to the importing countries due to being very expensive to transport if fractions of petroleum, diesel, paraffin, bitumen, gasoline are extracted.

Refining of Crude Oil

- The first phase is done in a fraction chamber through a process called vaporization where hydrogen and carbon compounds are broken down in to different fractions
- Fractions are obtained in a tall tower called the fraction column where condensation into liquid occurs
- During distillation, the separate hydro-carbons are collected in different levels as they condense forming kerosene, petroleum gas, wax, gasoline, bitumen, lubricating oil, etc.
- The second phase involves converting the hydro-carbons from one fraction to another in a process called cracking

due to the demand for lighter ones like petro.

- Cracking is either done by
 - (a) Thermal cracking- involves the breaking down of heavy oil fractions which are heated under high pressure until they break into lighter ones
 - (b) Catalytic cracking- involves the breaking down of heavy oil fractions with the help of a catalyst like silica under low pressure and temperature
- The third phase involves the purification of fractions to remove any impurities particularly sulphur which makes the fuel oil non effective

Products extracted from Crude oil

- Natural gas- an excellent fuel oil

- Petroleum gas- like ethane, butane, propane for making chemicals
- Gasoline- used in the internal combustion engines for land transport
- Kerosene- used as a domestic fuel and making jelly
- Gas oil- for making diesel oils used for powering most public vehicles, lorries and locomotives
- Bitumen- a black residue for making fine surface roads (tarmac roads)

Importance of Oil mining

- A lot of revenue is earned by the Nigerian government thru taxes from oil companies like shell and Total.
- A lot of foreign exchange through the export of crude oil and other oil

products to countries like Sweden, Canada, and Great Britain.

- Reduction in government expenditure on oil related products
- Industrial development in the south and central i.e. Refineries, petro-chemical industries, cosmetic and pharmaceutical industries, etc
- Infrastructure development in the Niger Delta region especially road and railway
- Urbanization in the region e.g. Callabar, Port Harcourt, Lagos, etc
- Profits from oil mining support other sectors of the economy like education, transportation and agriculture
- Income to the miners/drillers thus improving their living standards

- Provision of cheap fuel oil for domestic market thus improving the living standards of the Nigerians.
- Job creation in the oil sector and other related fields like transportation e.g. drivers,miners,geologists
- Promotion of international trade and relations with the countries that import Nigeria's oil e.g. Sweden,Canada.
- However, there is pollution of the environment through testing and refining the crude oil
- Eco-system of the Niger delta has been changed due to exploration, thru cutting down trees which lowers the water table.

- The oil sector has attracted much of the government funding suffocating other sectors.
- Niger delta is slowly disappearing since the natural flow of water and deposition of sediments by the river has been tampered with
- Agriculture has been limited since much of the land is used for oil exploration and exploitation
- Income inequality and regional imbalance between the oil rich south and the nomadic north
- Profit repatriation since most of the drilling companies are foreign
- Rural-urban migration as people seek for employment in the south
- Soil texture of the delta has been affected due to oil spillage and

pollution killing bacteria and other organisms

Gold mining in South Africa

Gold is the most important mineral mined in South Africa measured by value of output and it accounts for over $\frac{3}{4}$ of the total value of all South Africa's minerals produced including the by-products of gold like uranium and silver.

Gold is found in the basement rock called reef which contains quartzite and according to the US geological survey, South Africa has 6000 metric tons of gold reserves.

The Witwatersrand is the name given to the gold mining area which lies between Krugerdorp and Spring through Johannesburg on the Archaean

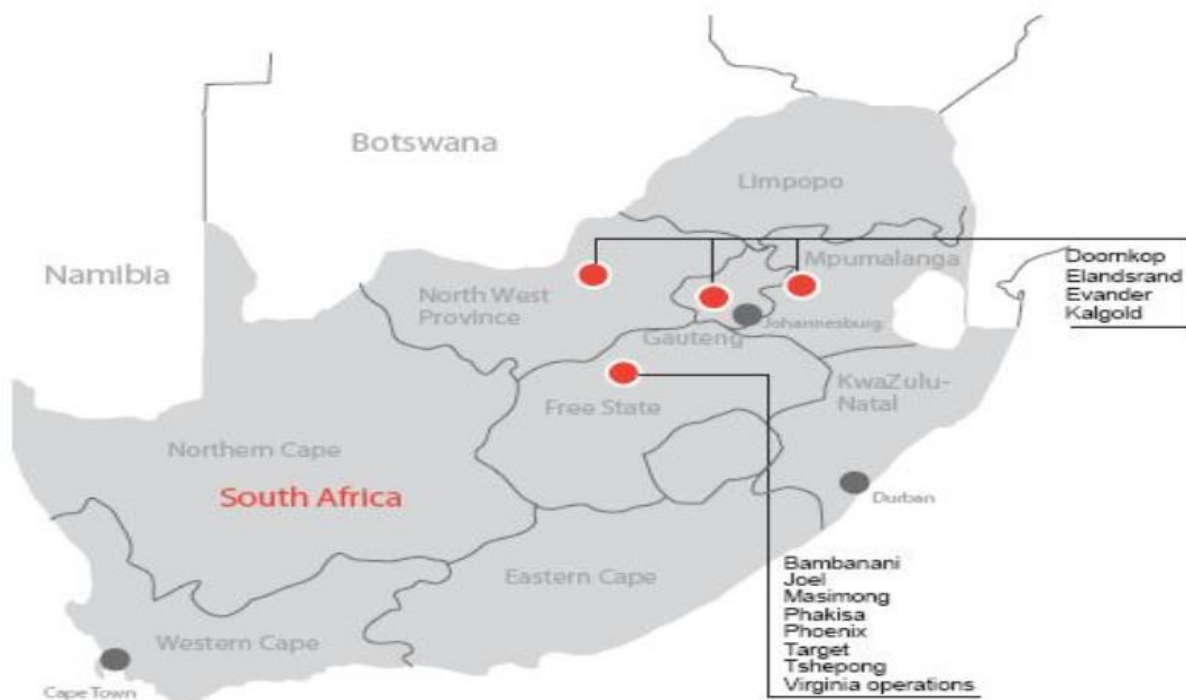
Witwatersrand basin, a gold placer deposit with greenstone belts like Barberton (in Mpumalanga province and Kraaipan (west of Johannesburg near Kuruman).

The major mines include Mponeng, Afrikaaner Lease, Bamabani, Buffelsfontein, Doornkop, etc with mining companies such as Harmony, Goldfields, AngloGold Ashanti, African Rainbow minerals limited, DRD Gold limited, Central Rand limited, etc

South Africa's Witwatersrand accounts for 40% of world's gold reserves in the massive Wit sedimentary basin stretching from an area of approximately 400km across the Free State, northwest and Gauteng province.

Other minerals include platinum, vanadium, chromium, uranium, manganese, coal, etc

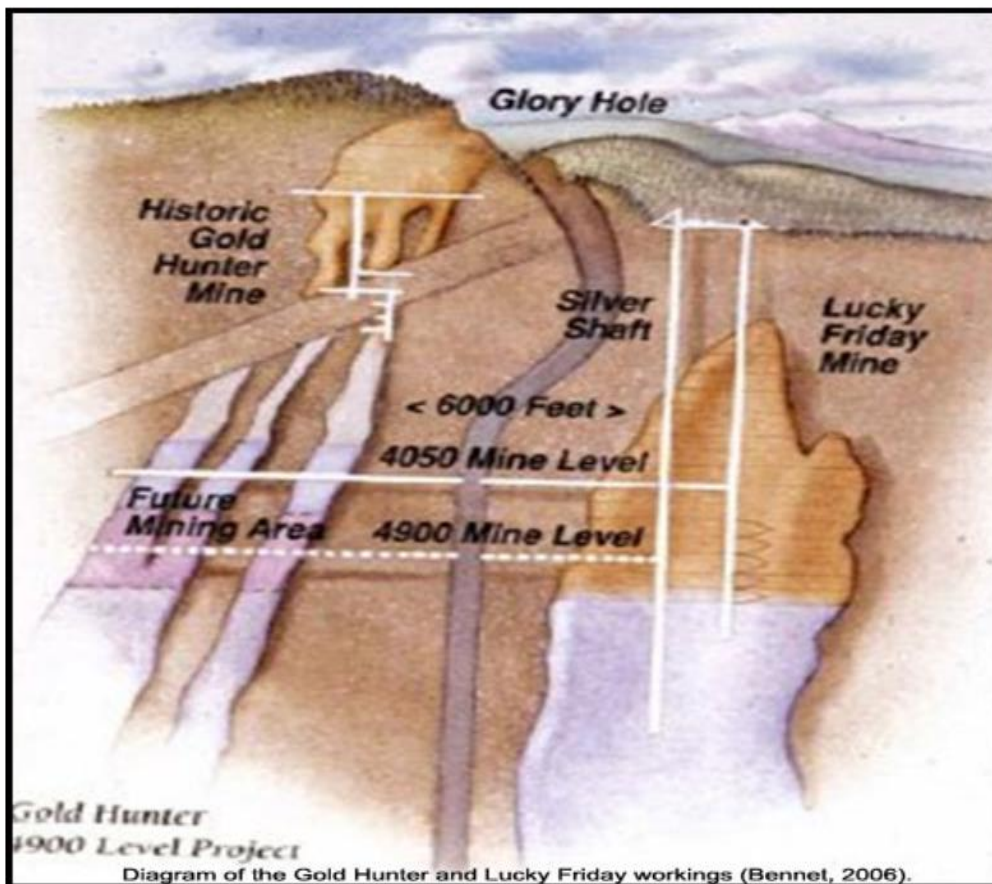
Sketch map showing Gold fields in South Africa



Mining of Gold

- It is done with the use of shaft method due to the great depth of over 4000meters below the surface. It involves constructing tunnels or shafts that link to the ore body and connect to the main shaft directly from the surface

Illustration



Processing of Gold

Either

- After the ore is excavated, its brought to the surface and crushed to undergo the cyanide process
- It is then dissolved in a sodium cyanide solution to separate it as gold cyanide or silver cyanide solution

- Later zinc is added to the solution to precipitate out residual zinc, as well as the desirable silver and gold metals to make it concentrated
- Zinc is removed with sulfuric acid leaving behind a gold or silver sludge that is generally smelted into ingots by super-heating and sent to a metal refinery for final processing into 99.9% pure metals

Or

- Activated carbon is used in extracting gold from the leach solution, that is, into the porous matrix of carbon
- Gold is removed from the carbon by using a strong solution of caustic soda and cyanide known as elution
- Gold is then plated out onto steel wool through electro-winning
- The by-product of uranium is then separated into vessels ready for use

Factors that favored gold mining in South Africa.

- Extensive deposits of gold in the Witwatersrand

- Cheap skilled labor initially provided by the Boers and British settlers\Utilanders.
- Advanced technology of using underground shafts
- Efficient transport and communication networks like railway and road e.g. Transvaal Railway.
- Political stability following the colonization of South Africa by the British in 1814.
- Wide/ready market for gold due to its international value in countries like Britain, USA, Japan.
- Positive government policy especially of the whites and later the Black government under Nelson Mandela (RIP).
- Growing industrialization where gold was required to be put as a coating for easy marking like jewelries
- Abundant electricity for lighting up the tunnels from Vaal dam

Importance

- Jobs were created to both the Africans and the Europeans as miners, managers, and drivers.

- Government earns revenue of about 120 million \$ annually in terms of taxes and profit share
- Industrial development in the region especially the Orange Free State province
- Infrastructure development in the region like the road and railway network linking major towns to the mining centers
- Growth and development of ports like Durban, Port Elizabeth, East London and Maputo that serve the region
- Promotion of immigration and rural-urban migration of both the Africans and Europeans
- Development of urban conurbations i.e. well built cities that join each other
- Income to the miners thereby improving their standards of living
- Foreign exchange through the export of gold to the world market
- Promotion of international trade and commerce
- Avenues of academic research in engineering, geology, etc

(4-08-2016)

INDUSTRIAL DEVELOPMENT IN AFRICA

Industrialization refers to the process of transforming raw materials into semi-finished and finished products for human consumption.

An industry is a collection of firms that deal with the transformation of raw materials into consumable products.

Industrial development in Africa owes its success to the early inhabitants like the Bantu who practiced iron smelting, pottery, weaving and early settlers like the British and Boers who were attracted by the mineral discovery of gold, diamonds, copper, iron ore, etc during the era of the scramble and partition of Africa.

However, the current growth and development of industries is attributed to the coming of white settlers (Boers in 1648-52 and British in 1795-1806), international trade and era of science and technology.

Types of Industries

- Primary- concerns the extraction of natural resources from the physical environment without adding or changing anything e.g. lumbering, mining, agriculture, stone quarrying, etc
- Secondary- concerns the transformation of raw materials into semi-finished or finished products that are consumable e.g. refineries, food processing, iron and steel manufacturing, etc

- Tertiary- concerns the transfer or transportation of raw materials, semi-finished or finished products from manufacturing centers to the consumer centers

Industrialization in South Africa

It is one of the most industrialized countries in Africa together with Egypt, Zimbabwe, Nigeria, etc

Industrial development in South Africa owes its success to the coming of the white settlers; the Dutch and British, and mineral discovery of diamonds in 1867 at Kimberly and gold in 1885 and Witwatersrand.

Major Industrial towns

- Pretoria- the administrative capital of South Africa having food processing,

car assembly plants, iron and steel, engineering industries

- Johannesburg- an important commercial town having textiles, food processing, motor vehicle manufacture, glass ware, oil refineries, chemical industries, paper and pulp, iron and steel, etc
- Durban- a commercial port having ship building, textile, automobile manufacture, food processing, furniture, oil refineries, chemical industries, etc
- Port Elizabeth- also a commercial port having motor vehicle manufacture, textile, food processing, chemical industries, etc

- East London- southern coastal town having food processing, motor vehicle manufacture and chemical industries
- Cape Town- an important coastal town having oil refineries, chemical, engineering, textile, food processing, vehicle manufacture, etc

Sketch map showing major industrial towns



Factors that favored

- Abundant raw materials ranging from agro-products to minerals
- Discovery of gold and diamonds at Kimberly and Witwatersrand that necessitated the construction of industries.
- Cheap skilled labor provided initially by the Boers and British and later the elite Africans
- Efficient transport and communication networks linking industries to market centres
- Large sums of capital to set up industries, buy raw materials, etc
- Political stability that attracted investors from within and outside

- Wide/ready market potential for the industrial products in South Africa and Britain.
- Abundant water supply from rivers like Orange, Vaal, Kei, Limpopo, Fish, etc. that is used as a coolant and raw material.
- International relations opening up international market with countries like Japan.

Importance

- Jobs have been created for the people living in South Africa and migrants from Zimbabwe, Botswana, Mozambique, etc
- Proper utilization of the would-be idle natural resources
- Revenue to the government through taxation and licensing

- Foreign exchange through the export of industrial products
- Provision of cheap quality products to the country men.
- Income to the workers thus improving their standards of living
- Promotion of international trade and relations with the countries that import South Africa's products.
- Infrastructure development of railway and roads in the industrial areas
- Profits from the industrial sector sustain other sectors like education, tourism, agriculture, etc
- Urbanization in the industrial regions like Durban, Pretoria, etc
- Offer market to locally made products through the backward and forward linkage

- Economic diversification of agriculture, mining, industry, etc
- However, industries pollute the environment through wastes
- Occupy a lot of land which would be used for other activities
- Destruction of the eco-system i.e. killing and displacing organisms, deforming landscape, etc
- Rural-urban migration to the industrial areas

Industrialization in Egypt

Egypt is located in North Africa and one of the most industrialized nations with Cairo and Alexandria as the most industrialized towns.

The major industries include oil refineries, textiles, electric engineering, chemical, sugar refineries, iron and steel, cement factories, salt industries, ship building, etc

Sketch map showing industrial towns in Egypt



Factors that favored

- Large sums of capital to buy inputs
- Positive government policy aimed at economic development through setting up industries

- Abundant raw materials like crude oil, iron ore, cotton used to make various products.
- Great/wide market potential for Egypt's industrial products within and outside Egypt
- Abundant/cheap skilled labor by the natives and foreigners especially the British and French
- Efficient transport and communication networks like roads, railway and water that transport raw materials and finished products.
- Abundant water supply from river Nile, Mediterranean and Red sea used as a coolant and raw material.
- Abundant hydro electricity power for running machines and lighting from Aswan high dam

- Stable political environment that attracted investors dating back from the 1880 following colonization and construction of the Suez canal
- Extensive land for construction and expansion of industries.
- A desert climate that necessitated economic diversification since agriculture was not doing well
- Desire for self-reliance in consumer goods and reduce on importation of industrial products to save money

Importance

- Job creation to the people as managers, drivers.
- A lot of revenue to the government through taxation and licensing

- Improving the balance of trade through setting up import substitution industries
- Income that helps improve on standards of living of the workers.
- Cheap consumer goods have been provided hence improving the standards of living.
- A lot of foreign exchange is earned through the export of industrial products
- Industrial skills have been acquired by the people hence improving on the quality of products.
- Proper utilization of natural resources like oil, phosphates, tin, copper
- Improvement of international trade and relations with the countries that import Egypt's products.

- Provide market for the local raw materials like minerals.
- Infrastructure development through which services are provided e.g. roads, railways and waterways.
- Avenues for academic research and study in industry.
- However, industries pollute the environment by emitting fumes
- Rural-urban migration to industrial towns causing regional imbalance
- Slum development near the industrial towns by the less paid and unemployed people
- Profit repatriation due to the foreign investors
- Destruction of the eco-system by expanding industrial parks

Problems facing Industrial development

- Limited skilled labor to work in the various industries
- Competition from foreign imported goods that appear cheap and of good quality i.e. Chinese goods.
- Limited domestic market for home produce
- Limited raw materials due to the increasing industrialization
- Limited oil supply for running the machines and transporting goods
- Limited land for expansion especially along river Nile due to competition from mining, agriculture, settlement
- Limited water supply especially for the food processing and beverage industries
- Depreciation of industrial machines due to being over used

- High cost of producing capital quality goods like machines, etc
- Profit repatriation of the funds that would have developed the country
- Price fluctuation on the world market especially for the agro-related goods that are short lived

TRANSPORTATION IN AFRICA

The transport and communication networks in Africa have evolved from primitive means like using human messengers, caravans, canoes on water to modern means like road, air, water, railway, pipeline, subways, etc

Transport refers to the movement of goods, services and passengers from one geographical location to another.

Types of transport refers to the category of description like land, air and water

Means of transport refers to the nature or mode with which goods, services and passengers are transferred from one place to another like road- cars, cycles, railway- wagons or locomotives, air- airplanes,

parachute, rocket, helicopter, pipeline- synthetic or metal pipes for liquids, etc

Road transport

This concerns movement of goods, services and passengers on a road using cars, Lorries, motorcycles, bicycles, etc

Advantages

- Very cheap for the lay man and short distances
- Very flexible in case of change in plan
- Relatively fast for short distances
- Very reliable due to unpredictable life changes
- Very convenient especially for door-to-door delivery
- Easy to construct as compared to railway and air
- Less affected by relief and drainage since it can maneuver
- Links up very remote areas with ease

Disadvantages

- Limited carrying capacity
- Prone to weather conditions like rainfall, etc

- Faces traffic jam especially at peak hours
- High risks of high jacking, highway robbery and political instability
- Relatively expensive for long distances with cargo/luggage
- Prone to accidents and the survivors are few in case it is fatal
- Return journeys are always uneconomical since items to return may not be there
- Not very suitable for transporting very perishable and valuable items for long distances
- Sometimes affected by relief in terms of construction

Railway transport

This concerns the movement of goods, services and passengers on well developed rails using wagons or locomotives. In Africa, this is limited to transporting goods and services except for Egypt, South Africa, Zimbabwe, and Kenya where passenger trains still exist.

Advantages

- Very convenient for bulky goods over long distances

- Less affected by weather
- When constructed, it is cheap to repair
- Relatively cheap when transporting bulky goods over long distances
- Very convenient for transportation of very many goods due to many wagons
- Has a large carrying capacity as compared to road
- Has a fixed time table or schedule for departure and delivery

Disadvantages

- Very slow leading to delay in delivery
- Very expensive when establishing and constructing due to a lot of steel and aluminium required
- prone to political instability
- Not very convenient for emergency deliveries
- It is only limited to places where the rails exist
- Networks are not evenly distributed in many parts of a given country and other countries have different gauges limiting cross border links
- Has limited carrying capacity especially the old models in many African countries

Water transport

This concerns the movement of goods, services and passengers on navigable water bodies using canoes/boats, ferries, ships, sub-marines, etc.

Advantages

- Offers the best alternative where the others do not exist
- Carry bulky goods between territories especially those bordered by water
- Canoes, boats, ferries, etc are easily constructed due to abundant wood, plastics and aluminium
- Rarely affected by political instability except where navigation decrees have been made
- Well defined time schedules for departure and delivery
- Relatively cheap when transporting bulky goods overseas

Disadvantages

- In case of accidents, survivors are few
- Greatly affected by weather like fog, frost, rainfall, etc

- Interrupted by rapids and falls especially on rivers and some water bodies are narrow and shallow
- Prone to accidents caused by underlying rocks, strong waves, marine predators, weather, etc
- Maintenance costs are very high due to the various chemicals in water that affect vessels.

Air transport

This concerns the movement of goods, services and passengers at a recommended height above sea level in specific pressure zones using space wagons like rockets, parachutes, planes, etc

Advantages

- Quickest means of transport
- Has an established time schedule
- Less affected by congestion especially in space
- Less affected by relief during the course of travel
- Very convenient for perishable and expensive goods
- Carries a variety of goods and passengers though with specific weight

Disadvantages

- Has limited carrying capacity
- Limited by international space boundaries like no-fly zones
- Flights are limited to high pressure belts due to body weight
- Inconvenienced by weather like cloudiness, mist/fog. Etc
- In case of accidents, there are a few survivors

Tazara/ Tanzam railway

This is one of the major railway networks in Africa constructed between 1971 and 1975 aimed at opening up landlocked Zambia to the outside world. The project was initiated with the help of China which had already developed interests in port Dar-es-salaam.

It costed nearly 400 million dollars covering a distance of 1860km moving through towns like Dar-es-salaam, Mbeya in Tanzania, Kasama, Mpika, Kapiri-mposhi, Lusaka, and Livingstone in Zambia.

The railway line had an initial carrying capacity of 30,000 tons of copper joining other networks linking to Bulawayo in Zimbabwe, Lobito in Angola, etc.

Sketch map showing the extent of the Tazara





Objectives

- To provide Zambia with an alternative route to the sea for easy export of copper
- To open up remote parts of southern Tanzania which were rich in coal and iron ore plus northern Zambia
- To reduce transport costs in importing and exporting goods to and from Zambia.
- To pave way for mineral exploration particularly copper in the Shaba province of Zambia
- To enhance international or regional relations between Tanzania and Zambia

Benefits

- It has strengthened political and social ties among Tanzania, Zambia, and China
- Provided landlocked Zambia with a reliable access route to the Indian Ocean.

- Stimulated mineral exploration and exploitation of copper in Zambia and iron ore, coal, diamond in Tanzania.
- Promoted plantation agriculture in southern Tanzania like rice and sugar cane in Kilombero valley
- Growth and development of ports like Dar-es-salaam acting as an entry port
- Promoted industrialization in southern Tanzania and northern, central Zambia e.g. copper refineries.
- It eased the importation of machinery which was very vital for copper mining in Zambia and coal in Tanzania
- Job creation in the area particularly the train sector as captains and station managers.
- Opened up very remote areas of northern Zambia and southern Tanzania to trade hence development.

Problems facing the Tazara railway.

- Very expensive to maintain due to long distance of 1860km from Dar-es-salaam to Lusaka
- Its slowness has limited its usage affecting benefits and business potential

- Changing political priorities of the two governments i.e. Zambia and Tanzania.
- Inadequate funds to buy new wagons, spare parts hence reducing on the commodities carried.
- Withdrawal of the Beijing government support from fully funding the project following its initial investment of 400 million \$
- Prone to hijackers who steal items being transported, vandalizing wagons parts and rails, etc
- Occurrence of accidents due to de-railing damaging wagons, goods being transported , etc

FOREST EXPLOITATION IN AFRICA

Forestry is the science of planting, maintaining and harvesting tree species for commercial use for either natural or artificial forests.

Africa is blessed with luxuriant vegetation ranging from tropical hardwood trees to artificial soft wood trees like eucalyptus and pine. These occupy thousands of kilometers in countries like Gabon, Swaziland, DRC, Cameroon, Nigeria and Ghana.

Forest exploitation in Africa is done using both traditional methods like axes, pangas, hand saws and modern methods like motor saws, etc.

Gabon Forest industry

It is one of the African countries whose economy is based on forestry.

Located south of the Sahara on the west coast of Africa covering 268,000sq.km. Forests cover about 84.5% (220,000sq.km) of the land area approximately 21,775,000 hectares containing over 400 species and account for 75% of the export earnings.

Commercial exploitation began as early as 1892 and was the primary source of economic activity till 1968 with companies like Compagnie Equatoriale des Bios-CEB and Thanry Gabon Industrie-TGI, Rougier, Leroy-Sonae, SHM-interwood, Basso Timber industries, etc.

Gabon's reserves of exploitable timber include okoume, ozigo, ilomba, azobe, padouk, mahogany, kevazingo, ebony, dibetou, movingui, zingana, etc with 85% being company production and 15% as

family production. The forests are run by the Socite Nationale des Bois du Gabon that was established in 1976 as a semi-state organization i.e. 51% is state and 49% by the forest companies.

Sketch map showing forest cover



Factors that favored

- Much of the country is covered by natural and man-made forests
- Presence of commercial tree species like okoume, ebony, ozigo and mahogany
- Well laid drainage with river Ogooue and Ngounie which are navigable
- Large sums of capital by the foreign companies from USA, Japan, Indonesia, and the government
- Big number of foreign companies that exploit the timber like CEB, TGI, etc
- Cheap skilled labor for felling trees, cutting into logs, etc
- Efficient transport and communication networks like road, railway, water, etc
- Supportive government policy that enhanced sustainable use of the forest
- Relatively infertile soils that could not support arable farming
- Conducive equatorial climate with 22-27 temperature, 1500-2400mm of rainfall that favors tropical rain forest growth

Importance

- Provide timber for domestic and industrial use
- Sources of rivers like Ogooue and Ngounie
- Industrial development in the area like saw mills, furniture
- Infrastructure development like Trans-Gabon railway and Ndjole-Bitam highway
- Enhancement of wildlife conservation like reserve du Fouari, reserve du Nyanga, pare nationale du Petit Loango, pare nationale de l'Okanda, etc
- Foreign exchange to the government through export of timber and timber products.
- Income to the lumber jacks thus improving their standards of living
- Wild fruits and food is obtained by the people
- Climate modification in the country
- Avenues for academic study like botany and zoology
- Urbanization like Franceville, Moanda, Kango, Lambarene, etc
- However, they occupy a lot of land that would have been used for
- Harbor tropical disease vectors and predators that harm man

- Induce heavy rainfall that causes flooding and destruction of human settlement and crop land

Swaziland forestry industry

It is a small country in southern Africa near the tropic of Capricorn bordered by South Africa in the south and west and Mozambique in the north, and east.

Latitudinally it is at 26° 30' S and 31° 30'E.

Swaziland has land coverage of 17,363 sq.km with forest coverage of 625,400 ha of which 162,400 ha is commercial plantations and 464,000 ha is indigenous forests. Only 11% is arable land.

It has a population of 1,167,834 people with a capital at Mbabane having 95,000 people though Lobamba acts as a royal and legislative capital.

The land is sub-divided into 4 districts i.e. Hhohho, Lubombo, Manzini and Shiselweni with the highest point as Emlembe at 1,862 m and lowest as Great Usutu river at 21 m.

The government with the Common Wealth Development Co-operation launched a project to

afforest the deforested areas and the major forests are Nhlanguano in the south, Pigg Peak forest in the west and Great Usutu in the southwest.

The basic tree species include the pine, eucalyptus, wattle tree, etc sold to Taiwan, South Africa, Japan, Britain, etc with sawmills at Bhunya and Mbabane.

Summary table showing characteristics of vegetation

Man-made forests	Natural forests
Ever green	Ever green
Planted by man with selected species	Grows naturally under natural conditions
Mainly soft wood trees	Mainly hard wood trees
One pure stand of species	Variety of species
Planted carefully on selected areas	Unplanned growth
Have corridors	Have no corridors
Little undergrowth	Thick undergrowth
Mature early (15 years)	Long maturity

Summary of Land use

Use	Percentage area
Arable land	9.77
Permanent crop	0.7
Others	89.53

Sketch map showing forest cover



Factors that favored forest growth and exploitation

- Mountainous and hilly landscape that is not suitable for arable farming
- Sparse population of about a million and half people that left land uninhabited.
- Relatively fertile soils that favored tree growth
- Well laid drainage of the Great Usutu river and its tributaries and other rivers like Komati
- Supportive government policy of conserving the forest cover and afforestating the affected areas
- Abundant labor force e.g lumber jacks, drivers who carry out different duties in the forestry industry.
- Conducive temperate climate supporting tree growth
- Natural shield of relief especially Libombo favoring growth and limiting human interference

Importance of forestry (consider for Gabon)

FISHING IN AFRICA

Fishing is the art of rearing and harvesting aquatic fauna from a given water body. Fishing has come a long way from the traditional or pre-colonial

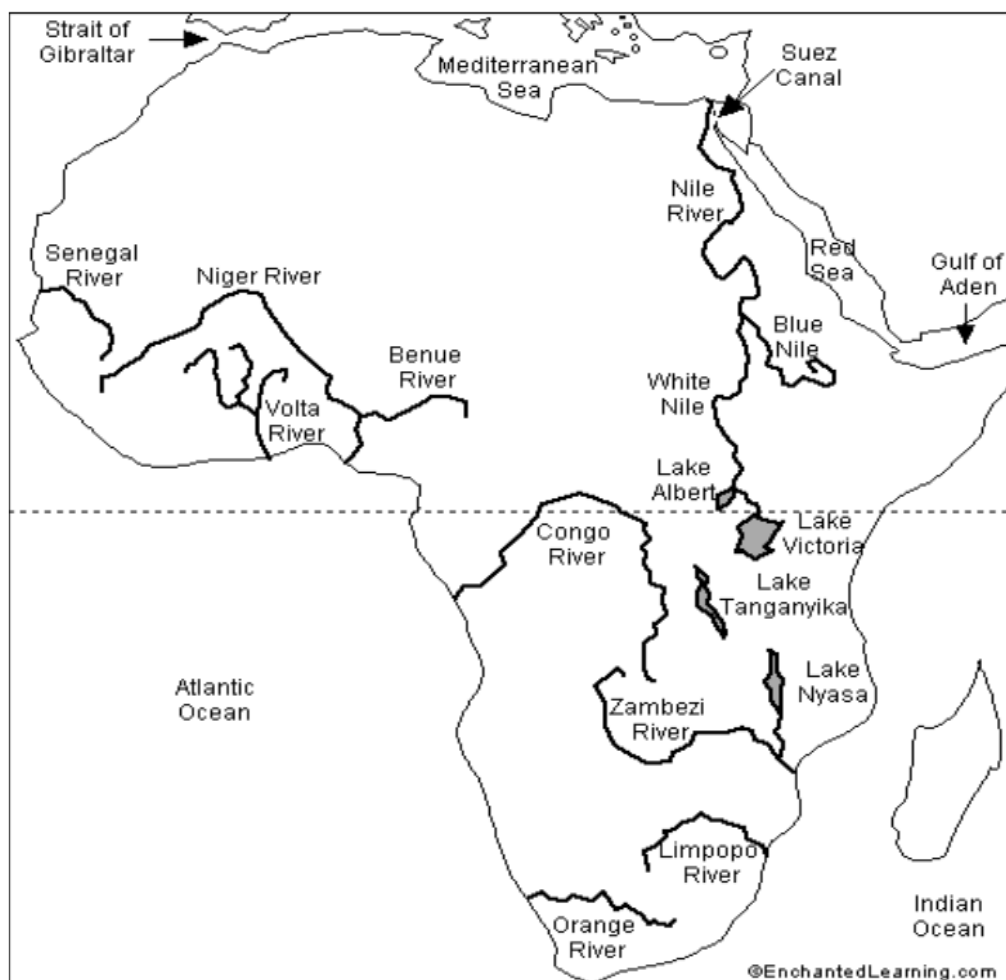
societies living around the interlucustrine region and other marshy areas to present day modern fresh water and marine fisheries.

There are a variety of fish species harvested in Africa like cat fish, sharks, lung fish, whales, electric fish, mud fish, silver fish, and lion lobster, pilchards, which are for domestic and commercial purpose.

African fisheries are subdivided into

- Fresh water- concerned with rearing and harvesting fish from relatively shallow water which is fresh like ponds, streams, rivers, swamps, lakes, etc partially for domestic and then commercial purpose especially the foreign market that desires fresh fish from uncontaminated water bodies.
- Marine water- concerned with rearing and harvesting fish from relatively deep water that is saline e.g. sea or ocean and along coasts for the tourist market at the coast and the foreign market at large that enjoys marine fish which is not very common with the native communities that live near oceans.

Sketch map showing fresh and marine water fisheries



Methods of Fishing

There are both traditional and modern methods used to harvest fish for domestic and industrial use.

(a)**Traditional methods**- used by primitive societies and individuals in very shallow water like swamps, rivers, etc

- Poisoning method- concerns the pouring of toxic liquid that suffocates fish, depriving it of oxygen leading to drowsiness thus harvesting either half dead or dead fish
- Spear method- concerns the throwing of medium sized spear towards the sighted fish species in relatively shallow water

Illustration



- Basket method- concerns the use of a corn shaped and hand woven basket that is laid in shallow water where fish gets into the basket and is trapped

NB: When answering any questions about methods of Fishing take note of

I. The method

ii. shape of the net\equipment used

iii. number of boats in case it needs boats

iv. Depth of the water where that method is applied/used.

Illustration



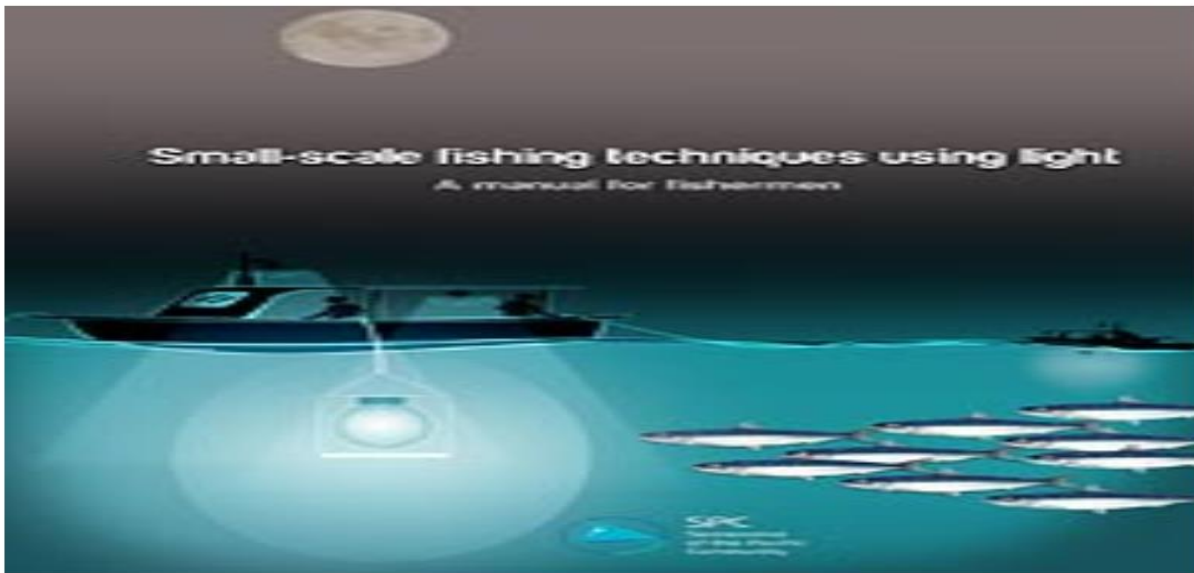
- Hand hook method- concerns a wooden rod having a string fastened on it with a bait that is cast into the shallow water to attract fish.

Illustration



- Use of light- involves lowering of a net into water and a lantern is shined into it attracting a swarm of small fish, the net is then scooped out into the boat

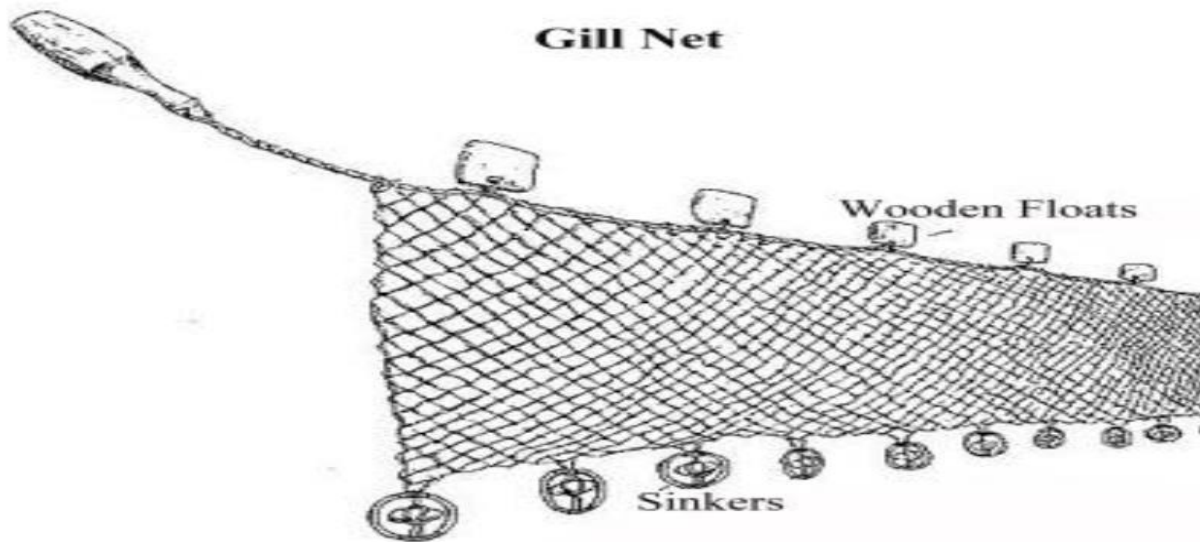
Illustration



(b) **Modern methods-** used by relatively civilized societies and commercial companies in deep water basically for market.

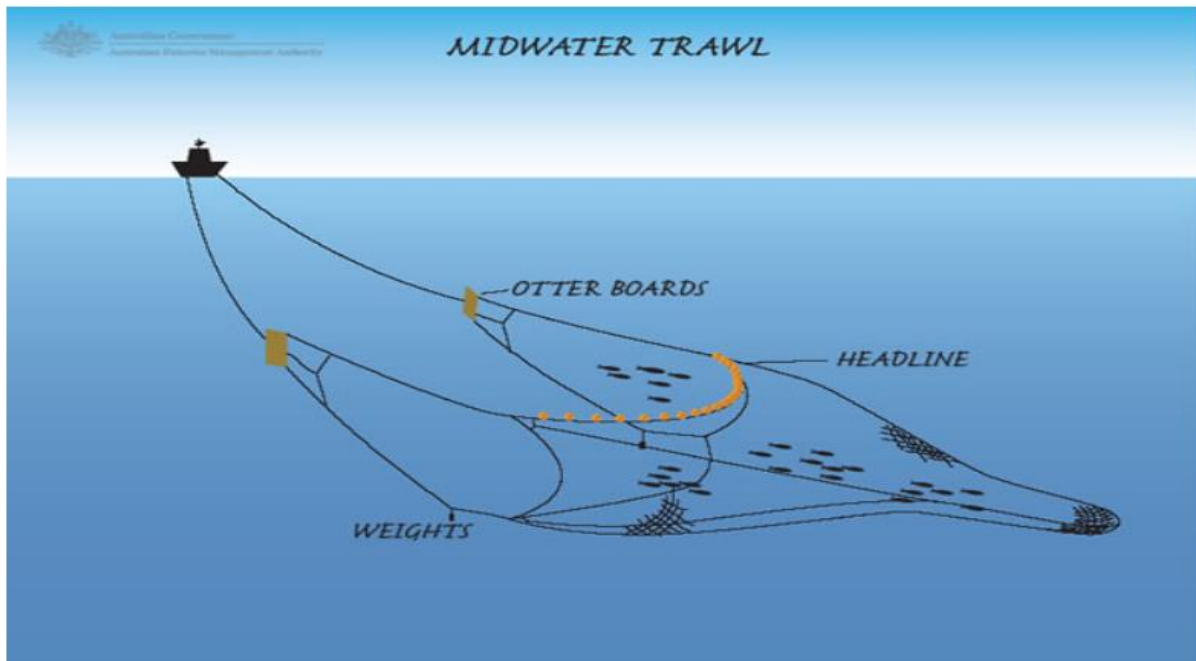
- Gill netting- concerns the dragging of a rectangular shaped net having floaters on top and weights at the bottom trapping fish by their gills it is used in shallow and relatively deeper waters.

Illustration



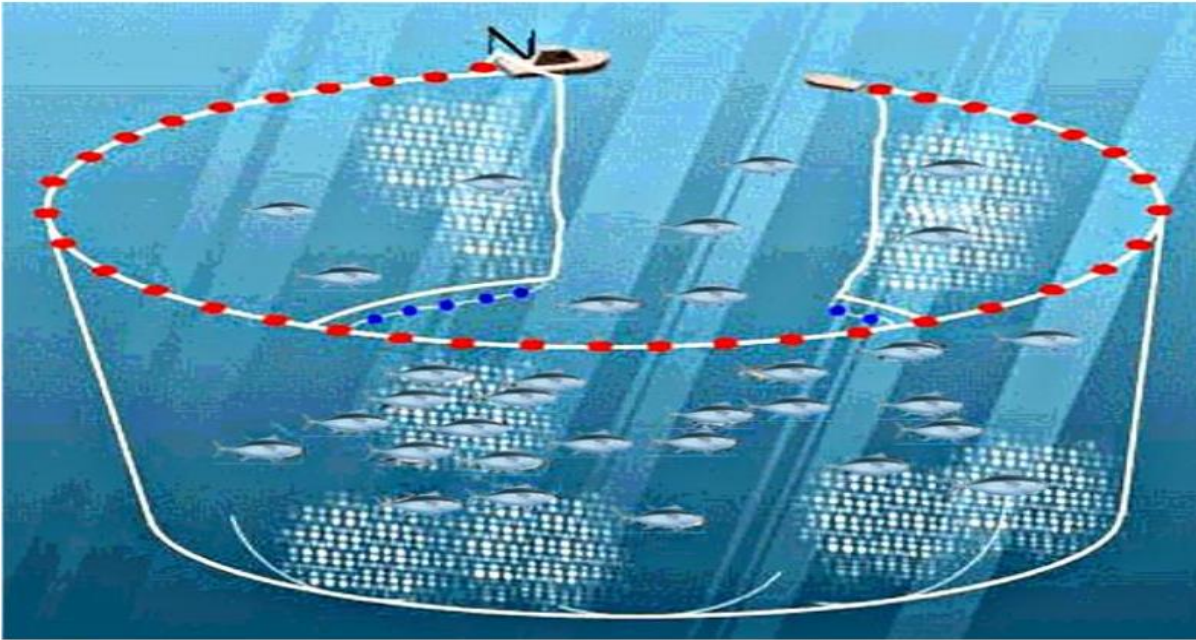
- Trawling- concerns the dragging of a bag-shaped net at the bottom of the lake/sea/ocean bed with an opening having boards to keep it open. It is attached to one boat that keeps on moving as the fish gets into the net.

Illustration



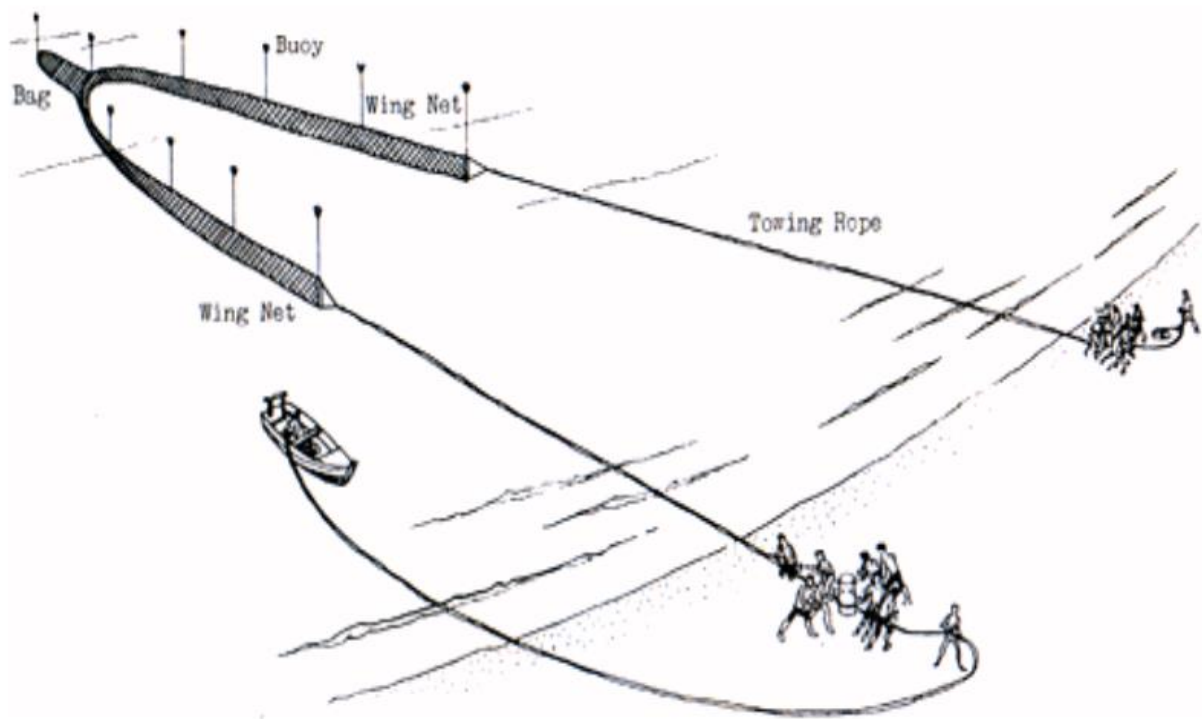
- Purse seining- concerns two boats dragging a circular net involving the beating (tycoonning) of water to scare away fish which finds its way into the net in between the boats it is used in relatively deeper waters.

Illustration



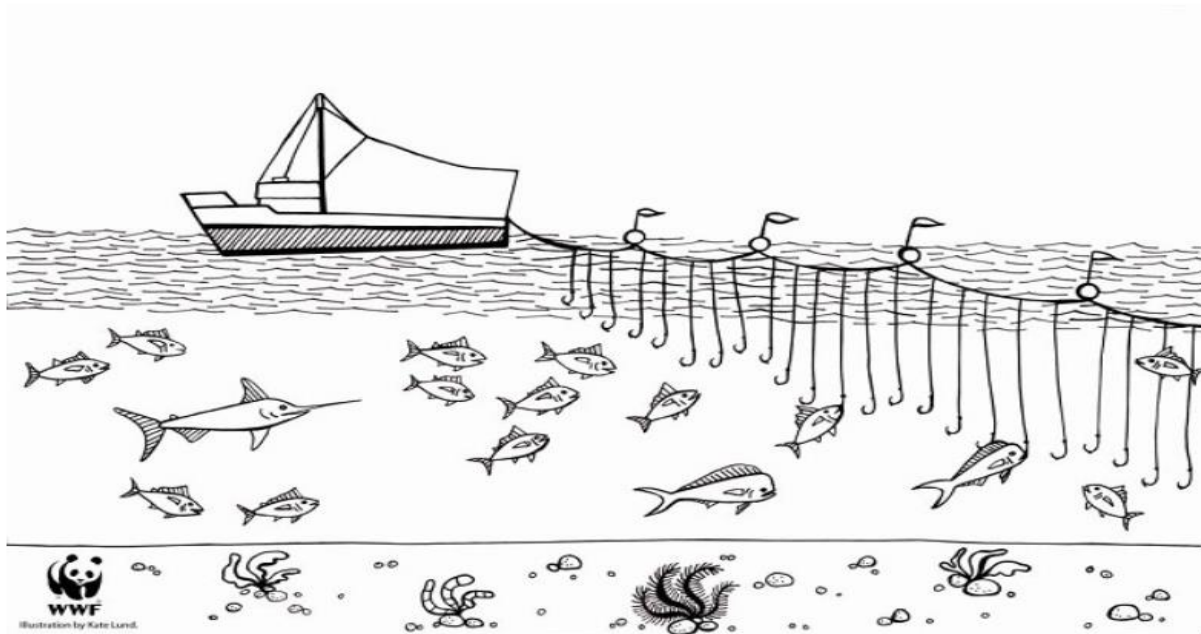
- Beach seining- concerns two people holding a net stationed at the coastal area who cast the net into the water fastened with a rope and it is later dragged back to the coast

Illustration



- Long lining- concerns a strong string that is attached on the boat with multiple hooks having baits that attract fish.

Illustration



Methods of Preservation

(a) **Traditional**- used to cater for individual needs and local market like

- Sun drying- involves the spreading of fresh fish on a leather or plastic tarpaulin exposing it to solar radiation that drains out the moisture

Illustration



- Salting- involves the salting of fresh or half baked fish so as to preserve it for a given time

Illustration



- Smoking- involves the spreading of fresh fish on a raised wire mesh and fire is lit underneath

generating relative warmth and smoke that drains moisture from the fish

Illustration



(b) **Modern-** used to cater for foreign and basic hotel markets like

- Factory drying- involves the arrangement of fresh fish with respect to species on raised meshed platforms and heat is regulated so as to drain out moisture in a confined room

Illustration



- Refrigeration- concerns the confining of fresh fish in a very cold room or chamber that makes it freeze due to certain regulated temperatures and can preserve the fish for years

Illustration



- Tinning- involves the packing of fresh or half baked fish in a metallic container having preservatives to be stored at a specified room temperature

Illustration





Factors that favor fishing in Africa

- Presence of cold and warm ocean currents that oxygenate water and favor plankton growth
- Great number of various fishing grounds ranging from swamps, rivers, lakes, etc

- Shallow continental shelf less than 62m in depth favors sunlight penetration for plankton growth and onshore fishing.
- Large population providing market for fish.
- Presence of long indented coastline with various breeding grounds
- Indented coastline\not straight for easy construction of harbors and landing sites
- Presence of variety of fish species like pilchards, sardines, lobsters and sharks that are highly demanded on the world market.
- Large sums of capital to buy fishing gears and equipment.
- Supportive government policy of diversifying the economies from agriculture to fishing.
- Use of modern and efficient fishing methods like gill netting, trawling and purse seining.
- Increasing level of industries processing fish and packing for export.
- Many coastal settlements which provide cheap labor, both skilled and unskilled.
- Political stability attracting both local and foreign investors

Uses of Fish

- Food and basic protein
- Making of animal feeds
- Making of fertilizers
- A leather material for making shoes, belts and bags
- Making of edible oil
- Making of cosmetics and soap

Importance

- Source of food rich in proteins
- Many job opportunities to mongers, officials, processors and drivers.
- A lot of government revenue through taxation and licensing the fish processing and packing industries.
- A lot of foreign exchange through export of fish to outside European and American countries.
- Stimulation of industrialization as a raw material in the cosmetics industry and manufacturing of bags, shoes etc.
- Stimulated growth and development of ports and landing sites e.g. Cape, Durban.

- Economic diversification\change in reliance basically from agriculture to fishing.
- Attraction of tourists through sport fishing hence generation of foreign exchange and revenue to the African governments.
- Research and study in fishing related activities and marine life
- Infrastructure development linking coastal or shore landing sites to industries and towns e.g. roads.
- Promotion of International trade and relations between nations
- Conservation of marine life and extinct species

Problems limiting Fishing

- Most of Africa's coastline is nearly straight limiting construction of harbors and landing sites
- Presence of coral reefs that interfere with movement of fishing vessels and nets at times they even cause accidents.
- Limited commercially demanded fish species on the International market.

- Low levels of technology used for fishing in remote areas like poisoning, basket, etc
- Poor preservation methods that cannot keep fish for long e.g. salting.
- Limited market for fish locally as some tribes refer to fish as a taboo
- Limited capital to buy better fishing equipment
- Competition for fishing grounds among countries like France, Spain, Poland fishing near Senegal, Mauritania, Guinea, etc
- Poorly developed transport and communication networks that limit marketing of fish
- Much of Africa lies in the tropics with hot temperatures all the year round which temperatures do not favor the proper multiplication of fish.
- Political instability which has characterized many African countries which prevents long term planning for development of the sector
- Indiscriminate fishing with illegal nets and use of bad methods like poisoning that lives some areas in the waterbodies with no fish

Means of improving Fishing sector

- Introduction of improved methods like motorized vessels, trawling, purse seining, etc
- Introduction of better preservation methods like cold storage
- Training of fish staff in the management and control of fisheries
- Formation of fishing co-operatives to raise capital collectively and conserving the fish
- Construction and rehabilitation of existing transport routes to link landing sites to roads and railway
- Setting up of fish processing industries
- Educating the people on the value of eating fish
- Introducing of fish farming in the area
- Introduction of marketable species like tuna, cod, mackerel, salmon etc.
- Attracting of foreign investors for capital and technology
- Setting up strict laws against indiscriminate fishing and other poor fishing methods

FISHING IN MOROCCO.

Found in western Sahara, Morocco is well known for fishing with its major fishing port being Dakhla

Sample questions.

URBANIZATION

Case study (a) Lagos, Nigeria

It is the most populous city or populous conurbation in Nigeria, with nearly 8m inhabitants, and the second most populous city in Africa.

The original settlers of Lagos were Yoruba fishermen, who founded the city. The city began in the fifteenth century as a Portuguese trading post exporting ivory, pepper, and slaves. It subsequently fell into the hands of the British, who began exporting food crops after outlawing slavery in 1807.

Lagos, a Portuguese word for "lakes," was a Yoruba settlement of Awori people initially called

Oko. The name was later changed to *Eko* (Edo: "cassava farm") or *Eko* ("war camp") during the kingdom of Benin occupation. It is likely that the name "Lagos" was given by Portuguese settlers who navigated from a coastal town of the same name in Portugal.

Formerly the capital of Nigeria, the city's problems with overpopulation prompted the creation of the city of Abuja, in the center of the country, to replace Lagos as national capital.

Lagos has a total of 1380.7 square miles (3577 square kilometers), of which 303.8 square miles (787 square kilometers) is made up of lagoons and creeks.

Most of the population lives on the mainland, and most industries are located there too. Lagos is known for its music and night life, which used to be located in areas around Yaba and Surulere. In recent years more night clubs have sprung on the island, making the island, particularly Victoria Island, the main nightlife attraction. Lagos Mainland districts include Ebute-Meta, Surulere, Yaba and Ikeja, site of Murtala Muhammed International Airport and capital of Lagos State.

Greater Lagos includes Mushin, Maryland, Somolu, Oshodi, Oworonsoki, Isolo, Ikotun, Agege, Iju, Ishaga, Egbeda, Ketu, Bariga, Ipaja, Ajah and Ejigbo.

Relief of Lagos

The city of Lagos lies in south-western Nigeria, on the Atlantic coast in the Gulf of Guinea, west of the Niger River delta, located on longitude $3^{\circ} 24' E$ and latitude $6^{\circ} 27' N$. On this stretch of the high-rainfall West African coast, rivers flowing to the sea form swampy lagoons like Lagos Lagoon behind long coastal sand spits or sand bars. Some rivers, like Badagry Creek, flow parallel to the coast for some distance before exiting through the sand bars to the sea. The two major urban islands of Lagos in Lagos Lagoon are Lagos Island and Victoria Island. These islands are separated from the mainland by the main channel draining the lagoon into the Atlantic Ocean, which forms Lagos Harbour. The islands are separated from each other by creeks of varying sizes and are connected to Lagos Island by bridges. The smaller sections of some creeks have been sand filled and built over.

LAGOS TOWN



Factors for development of Lagos

- Strategic location at the head of Lagos lagoon. The break in the long sand bar provide an entrance to the calm waters of the lagoon
- Presence of a well sheltered harbor with Victoria island in the east

- Presence of islands of Lagos, Victoria and Apapa mainland for loading and offloading as well as constructing facilities
- Presence of a deep dredged channel of over 8 meters deep connecting the port to the open sea allows free sailing of big ships
- Ice free conditions all the year enhances activities use
- Easy access to the rich hinterland consisting of Nigeria, Niger and northern Cameroon
- Well developed transport routes connecting the islands by bridges and freeways , air ports , railway lines, etc
- Low tidal range at the Atlantic shores enabling easy landing and sailing
- Ancient kingdoms like the Yoruba and the Benin that often transacted with neighbors like the Ghana kingdom
- Historical activities like slave trade i.e. trans-Saharan and Triangular trade where human beings were being sold and later legitimate trade
- Supportive government policy that aimed at putting up a territorial administrative centre to run the regions activities before it was later transferred to Abuja

- Shielded from strong waves by ocean islands like Equatorial Guinea making it safe for activities
- Conducive equatorial climate that attracted traders and natives to move to the coastal areas hence developing the area
- Relatively flat and gently sloping relief towards the ocean conducive for settlement, agriculture and trade

Functions of Lagos

- Industrial center with textile, printing, motor vehicle assembly, saw milling, vegetable oil processing, plastic making, etc
- Financial center with the leading major banks, insurance companies, etc
- Education center with the University of Lagos, Yaba college of Technology, Lagos State university, etc
- Residential center housing thousands of people working in industries, government, etc
- Cultural center with many art galleries, entertainment, museum etc
- Nodal/transport center from which major air, road and railway routes radiate from

- Administrative center with many government offices, non-governmental organizations, etc

Problems faced

- Over crowding in the city with a density of over 2500 people per square kilometer
- Pollution of the environment from industries, vehicles and people
- Inadequate supply of fresh water due to the increasing population
- Development of slums and their related evils
- Limited land for expansion as the city is basically surrounded by water
- Flooding due to the low lying altitude and heavy rains
- High crime rate caused by high population and unemployment
- Traffic jam due to the high number of vehicles on the road slowing down movement of passengers and goods
- Silting of the water ways that limits sailing inland towards the dock

Solutions to the above

- Transfer of the capital from Lagos to Abuja to reduce on the number of administrative duties

- Increasing on the number of states from twelve to nineteen each with its own capital
- Construction of housing estates and sky scrapers reducing on slums and crowding
- Construction of bridges to link islands to the mainland like Carter and Eko
- Encouraging self-help projects providing more employment opportunities
- Tightening security to curb crime and ensure law and order

Case study (b) Addis Ababa

Sometimes spelled Addis Abeba, the spelling used by the official Ethiopian mapping authority is the capital city of Ethiopia. In Ethiopian languages: Amharic, *Addis* *Abäba* "new flower"; Oromo, Finfinn, Ge'ez. It is the largest city in Ethiopia, with a population of 3,384,569 according to the 2007 population census.

As a chartered city (*ras gez astedader*), Addis Ababa has the status of both a city and a state. It is where the African Union and its predecessor the OAU are based. Addis Ababa is therefore often referred to as "the political capital of Africa", due to its historical,

diplomatic and political significance for the continent. The city is populated by people from different regions of Ethiopia – the country has as many as 80 nationalities speaking 80 languages and belonging to a wide variety of religious communities.

History of Addis Abbaba

The site of Addis Ababa was chosen by Empress Taytu Betul and the city was founded in 1886 by her husband, Emperor Menelik II. The name of the city was taken from parts of the city called *hora Finfinnee* ("hot springs") in Oromo. Another Oromo name of the city is Sheger. Menelik, as initially a King of the Shewa province, had found mount Entoto a useful base for military operations in the south of his realm, and in 1879 visited the reputed ruins of a medieval town, and an unfinished rock church that showed proof of an Ethiopian presence in the area prior to the campaigns of Ahmad Gragn. His interest in the area grew when his wife Taytu began work on a church on Entoto, and Menelik endowed a second church in the area.

However the immediate area did not encourage the founding of a town due to the lack of firewood and water, so settlement actually began in the valley south of the mountain in 1886. Initially, Taytu built a house for herself near the "Filwoha" hot mineral springs, where she and members of the Showan Royal Court liked to take mineral baths. Other nobility and their staffs and households settled the vicinity, and Menelik expanded his wife's house to become the imperial palace which remains the seat of government in Addis Ababa today. The name changed to Addis Ababa and became Ethiopia's capital when Menelik II became Emperor of Ethiopia. The town grew by leaps and bounds. One of Emperor Menelik's contributions that is still visible today is the planting of numerous eucalyptus trees along the city streets.

On 5 May 1936, Italian troops invaded Addis Ababa during the second Italo-Abysinnian war, making it the capital of Italian East Africa from 1936 to 1941 after killing about a million Ethiopians with mustard gas. After the Italian army in Ethiopia was defeated by the British forces during the East African campaign, Emperor Haile Sellasie returned to Addis Ababa on 5 May 1941—five years to the very day

after he had departed—and immediately began the work of re-establishing his capital.

Emperor Haile Selassie helped form the Organization of African Unity in 1963, and invited the new organization to keep its headquarters in the city. The OAU was dissolved in 2002 and replaced by the African Union (AU), also headquartered in Addis Ababa.

Ethiopia has often been called the original home of mankind due to various humanoid fossil discoveries like the Australopithecine Lucy. North eastern Africa, and the Afar region in particular was the central focus of these claims until recent DNA evidence suggested origins in south central Ethiopian regions like present-day Addis Ababa. After analysing the DNA of almost 1,000 people around the world, geneticists and other scientists claimed people spread from what is now Addis Ababa 100,000 years ago. The research indicated that genetic diversity declines steadily the farther one's ancestors traveled from Addis Ababa, Ethiopia.

Relief of Addis Abbaba

Addis Ababa lies at an altitude of 7,546 feet (2,300 metres) and is a grassland biome, located

at 9°1'48"N 38°44'24"ECoordinates:

9°1'48"N 38°44'24"E.^[11]The city lies at the foot of Mount Entoto. From its lowest point, around Bole International Airport, at 2,326 metres (7,631 ft) above sea level in the southern periphery, the city rises to over 3,000 metres (9,800 ft) in the Entoto Mountains to the north.

Factors for development

- Strategic location at the foothills of Ethiopian highlands
- Ice free conditions all the year enhances activities use
- Easy access to the rich hinterland consisting of Djibouti, Sudan
- Well developed transport routes connecting the city to major regions, air ports , railway lines, etc
- Historical activities like Christian civilization from Israel by the queen of Sheeba during the reign of king Solomon
- Supportive government policy that aimed at putting up a territorial administrative centre to run the regions activities

- Shielded from strong winds by the Ethiopian highlands making it conducive for settlement
- Conducive tropical climate mixed with desert climate that attracted traders and natives
- Relatively flat and gently sloping relief towards the Awash river for settlement, agriculture and trade

Functions of Addis Ababa

- Industrial center with textile, printing, motor vehicle assembly, saw milling, etc
- Financial center with the leading major banks, insurance companies, etc
- Education center with colleges, universities, etc, etc
- Residential center housing thousands of people working in industries, government, etc
- Cultural center with many art galleries, entertainment centers, religious institutions, etc
- Nodal/transport center from which major air, road and railway routes radiate to Egypt, Sudan and Djibouti
- Acts as political capital of Africa formerly housing the O.A.U and now the A.U

Problems faced

- Over crowding in the city due to the influx of natives, tourists and foreigners
- Pollution of the environment from industries, vehicles and people
- Development of slums and their related evils
- Limited land for expansion as the city is near the highlands in the north and Awash river valley in the south
- Flooding due to the low lying altitude of the Blue Nile and Awash and heavy rains
- High crime rate caused by high population and unemployment
- Traffic jam due to the high number of vehicles on the road slowing down movement of passengers and goods

Solutions to the above

- Construction of housing estates and sky scrapers reducing on slums and crowding
- Encouraging self-help projects providing more employment opportunities
- Tightening security to curb crime and ensure law and order
- Acquiring more land on the western side for expansion

Sample questions

- (a) Describe the factors which led to the development of Addis Ababa as an urban centre.
- (b) Explain the functions of Addis Ababa city.
- (c) Outline the effects of urbanization on the environment in Ethiopia.

Sketch map of Addis Ababa

